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Strait of Georgia Sport Fishery Creel Survey Statistics for Salmon and Groundfish, 1985

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STRAIT OF GEORGIA SPORT FISHERY CREEL SURVEY STATISTICS FOR SALMON AND GROUNDFISH, 1985

by

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ABSTRACT

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Catch and effort statistics for the Strait of Georgia tidal sport fishery are presented for each month in 1985. The statistics were derived by combining the data from over 39,000 interviews and 69 aerial surveys. Estimates were provided for the number of sport fishing boat trips and the catches of chinook, coho, and pink salmon along with rockfish, lingcod, dogfish and other finfish. Also given are numbers of marked (adipose fin-clipped) and unmarked chinook and coho examined during the creel survey, and the age composition and length distribution of chinook catches. The appendix includes all catch and effort statistics for each combination of month and Statistical Area.

Keywords: salmon, groundfish, creel survey, sport fishing, catch, effort, age composition, length distribution.

RÉSUMÉ

Shardlow, T. F. and L. D. Collicutt. 1989. Strait of Georgia sport fishery creel survey statistics for salmon and groundfish, 1985. Can. MS Rep. Fish. Aquat. Sci. 2033 : 60 p.

Les statistiques relatives aux prises et a l'effort de pêche de la pêche sportive de la zone tidale du détroit de Géorgie sont présentées pour chaque mois de 1985. Ces valeurs ont été obtenues en réunissant les données de plus de 39,000 entrevues et 69 relevés aériens. On y trouve les estimations du nombre de sorties des bateaux de pêche sportive et des prises de saumons quinnat, coho et rose en plus de celles de scorpènes, d'ophiodon, d'aiguillat et d'autres poissons. Le nombre de saumons quinnat et coho marqués (coupe de la nageoire adipeuse) et non marqués examinés au cours des relevés des prises et la composition par âges et la distribution par longueur des prises de saumon quinnat sont aussi présentés. On trouve aussi en appendice toutes les statistiques relatives aux prises et à l'effort de pêche pour chaque mois et combination de zones statistiques.

Mots clés: saumon, poisson de pond, releve des prises, pêche sportive, prises, effort de pêche, composition par âges, distribution par longueur.

1.0 INTRODUCTION

This report documents the 1985 catch and effort statistics for the Strait of Georgia sport fishery and discusses methodology for collecting these data. During the 1970s, the sport fishery grew to be the largest harvester of chinook and coho salmon in the Strait of Georgia. Figure 1 and Table 1 show historical catch statistics for the Strait of Georgia sport fishery for the period 1960-1985. Prior to 1980, fisheries managers recognized the need for accurate catch statistics. In 1980, the Strait of Georgia Creel Survey Program was initiated to meet the need for accurate and timely sport catch statistics primarily for chinook and coho. Since then, the objectives of the Creel Survey Program have been expanded to provide accurate estimates of all major sport-caught finfish, and age and length composition of chinook catches. This report is one of a series of Strait of Georgia Creel Survey Reports which document annual creel survey activities and estimation procedures, and provide official published Strait of Georgia tidal sport fishery catch statistics.

In 1985 the creel survey gathered a comprehensive set of annual sport fishing data for Strait of Georgia. There were no project interruptions during the year, and both aerial survey and interview data were collected on a continuous basis for the first time.

In this report, all figures, tables and appendices are located at the end of text.

2.0 METHODS

The Strait of Georgia Creel Survey is comprised of two independent surveys: angler interviews and aerial overflights. Angler interviews provide data on sport fishing catch per unit effort (CPE) and daily activity patterns. Aerial overflights provide estimates of the total sport fishing effort in the study area at the time of the aerial survey. These data are combined to provide monthly estimates of total sport fishing effort and total catch of salmon and groundfish in the sport fishery. In its simplest form, the estimated total catch is calculated by multiplying estimated total effort by catch per unit effort.

The design of the Strait of Georgia Creel Survey conducted in 1985 was similar to that used in 1984. Sampling was conducted during each month of the year and estimates were produced for 10 time periods. January and February data were grouped together, as were November and December data because of reduced fishing activity and sampling in these winter months. Mid-week days and weekend days were considered independently because sport fishing activity is known to be quite different between the two types of days. The Strait of Georgia study area was also stratified by geographic region. Catch and effort statistics were produced for each of the 10

Statistical Areas within the Strait of Georgia (Areas 13 - 19A, 19 B+, 28 and 29, Fig. 2); Statistical Area 19 B+ includes the portion of Area 20 east of Sheringham Point (see Appendix C for a complete description of the study area). Data collection, entry and preliminary processing were conducted for most of the year by DPA Consulting Ltd., and are reported in their 1985 document. Estimation of catch and effort statistics was conducted by the Department of Fisheries and Oceans.

2.1 FIELD SURVEYS

2.11 Angler Interviews

Sport fishermen were interviewed at the end of their fishing trip to determine time spent fishing, locations fished and catch of each species on the trip. Demographic information was also collected during each interview. Figure 3 shows the interview form used in 1985.

Interviewers trained in fish identification inspected each boating party's catch. Unlike other methods of collecting sport fishery information, such as mail-in or telephone surveys, there was little memory-related recall bias, non-response bias, and fish identification concern with this approach to determining sport fishery catch. Landed chinook and coho were checked for a missing adipose fin which indicates the presence of a coded wire tag embedded in the fish nose cartilage. In addition, scale samples for age determination and measurements for nose-fork length were taken during every sampling shift in the winter and every other shift in the summer. Five scales were removed from the INPFC (International North Pacific Fisheries Commission) preferred area of each biosampled chinook (Mosher 1968).

The interviews were conducted at 31 landing sites (boat ramps, marinas, or resorts, Fig. 2) representative of sport fishing activity in each Statistical Area. The number of sites selected in each area was dictated by targets of desired precision and number of surveyors available. For each area - day type - work block stratum, sampling shifts at a site were chosen on a near random basis from the total number of shifts available. For definition of the above terms (day type, work block, shift) see Appendix A.

2.12 Aerial Overflights

Aerial surveys, conducted from float planes travelling along pre-defined routes, allowed observers to count vessels actively sport fishing throughout the Strait of Georgia. Planes flew at an altitude of 500-700 feet to facilitate a broad range of vision and still allow easy identification of vessel characteristics. Each plane carried three observers, two on the right side and one on the left, and each observer counted sport fishing boats to his/her side of the flight path. Figure 2 shows the flight path used in 1985. The winter (October - April) flight path was slightly reduced to correspond with lower winter effort.

The flight path and time of departure were designed to cover major concentrations of sport fishing activity at peak periods. Whenever possible, the route was flown to keep most of the sport fishing boats to the right side to allow averaging of the two right side counts. To maximize precision, flying times during which fishing effort was rapidly changing were avoided. The number of overflights each month was governed by targets of desired precision and the expected number of interviews from the given number of sampling shifts (English et al. 1986). The days for overflights during a month were randomly selected for each day type.

2.2 DATA ANALYSIS

Data analysis included calculation of catch and effort statistics, calculation of variance of total fishing effort and total catch, estimation of marked chinook and coho salmon, and estimation of age composition of chinook catch. Appendix A details the methods and equations used in the above data analysis.

3.0 RESULTS

3.1 DISTRIBUTION OF SAMPLING EFFORT

Table 2 shows the number of creel survey interviews conducted by month and Statistical Area in 1985, and the number of monthly overflights. A total of 39,801 interviews (33,494 fishing interviews) and 69 overflights were conducted in 1985. The monthly distribution of interviews reflected the monthly distribution of fishing effort (number of boat trips, Table 3) (Fig. 4). Interview effort was reduced during winter months, especially for Statistical Areas 13, 14 and 15 in the northern portion of Strait of Georgia (Table 2). The total fishing interviews represented 5.3% of the estimated total fishing effort for the entire study area (628,513 boat trips, Table 3) and ranged in each Statistical Area from a low of 1.9% of the estimated fishing effort in Area 15 to a high of 9.0% in Area 28 (Tables 2 and 4).

3.2 SPORT FISHING EFFORT AND CATCH

The 1985 Strait of Georgia sport fishing effort and catch statistics are summarized for each species by month in Table 3 and by Statistical Area in Table 4. Appendix B shows the fishing effort and catch statistics for each combination of month and Statistical Area.

Sport fishermen made 628,513 boat trips during 1985, which is similar to the annual fishing effort since 1980 (Table 1). The fishing effort followed the same general seasonal pattern as seen in previous years (Fig. 5). Effort levels climbed steadily from April, peaked in August, and declined rapidly in September and October.

The total finfish sport catch in the Strait of Georgia in 1985 was estimated at 1,337,365 pieces (including steelhead and cutthroat trout, Table 3), and consisted of 79% salmon and 21% groundfish. An additional 703,264 salmon of mixed species were released by anglers (Appendix B-7). The two main catch groups are discussed below.

3.21 Salmon

Salmon sport catches in the Strait of Georgia in 1985 totalled 1,062,600 pieces (Tables 3 and 4) and consisted of 68% coho, 22% chinook, 9% pink salmon and 1% other salmon.

Chinook sport catches showed a considerable decline from the 1984 level, with anglers taking 234,838 fish (Tables 3 and 4) compared to 369,445 in 1984 (Fig. 1, Table 1). The majority of the catch was taken during the months of May, June, July and August (Fig. 6). The annual distribution of catch in 1985 as in 1984, was shifted slightly earlier in the season than in previous years (Fig. 6).

It should be noted here that three new chinook sport fishery regulations were introduced in 1985, that would influence catch levels of chinook. Effective May 15, the daily bag limit was reduced to two chinook on a year round basis. A short time later (June 5), the annual bag limit was reduced from 30 to 20 chinook. In addition to these two changes, a spot closure plan outlining 30 closures, was implemented. This plan was intended to prohibit fishing in specified areas for specific periods of time when chinook were believed to be most readily taken.

Seasonal catch efficiency for chinook showed the same pattern in 1985 as in 1984, with catch per boat trip being higher in early summer than in previous years (Fig. 7, Table 5). The earlier timing of the chinook catch seen in 1984 and 1985 was probably a result of greater than normal abundance of this species during the spring and summer. This greater abundance most likely resulted from a shortened commercial troll season. The commercial troll fishery, which takes the majority of its chinook catch in the spring months (Argue et al. 1987), was delayed in both 1984 and 1985 from April to July.

The highest annual chinook catches in 1985 were taken in Area 13 (22% of total) and Area 14 (19%), which was similar to the 1983 and 1984 catch patterns (Table 4, Fig. 8). In some months, other Statistical Areas dominated the catch (Appendix B-3). During the summer months (May - September) in 1985, 72% of the landed chinook were taken in the northern region of the Strait of Georgia - Statistical Areas 13 to 17. This was expected since the summer chinook catch is normally taken mostly in the north. In the winter months (January - April, October - December), 56% of the chinook catch came from the southern region - Statistical Areas 18, 19, 28 and 29. During November and December, many of the chinook came from Victoria/Sooke waters in Statistical Area 19B + and from Area 16.

The 1985 coho catch of 728,197 pieces (Tables 3 and 4) is the highest recorded for this fishery except for 1978 when an estimated 1,103,000 coho were caught (Fig. 1, Table 1). Coho catch was above average from April through September (Fig. 9) when over 98% of the catch was taken. Coho catches remained high despite similar or lower summer effort in 1985 compared to 1982 and 1984 (Fig. 5). This combined to produce mean monthly catch per boat trip of up to 1.7 fish (Table 5), well above values in previous years (Fig. 10). The highest coho catches were taken in Area 13 (36% of total) and Area 14 (30%, Table 4), which is similar to the catch pattern in previous years (Fig. 8).

In 1985, Strait of Georgia anglers caught approximately 91,000 pink salmon between May and October (Table 3). Significant pink catches were expected in 1985 because pink salmon returns to Strait of Georgia rivers (primarily the Fraser River) are much greater in odd numbered compared to even numbered years. Victoria to Sooke waters in Area 19B+ were responsible for 84% of the pink catch (Table 4).

The landings of other salmon consisted of chum and sockeye, and were estimated at about 8,000 pieces (Table 3). The majority of this catch was taken between August and December (92% of total, Table 3). Statistical Areas 13 and 19B+ showed the highest catch contribution (50% of total, Table 4). A large portion of the catch in Areas 17 and 19 consisted of chum salmon returning to local rivers, while the Area 19B+ catch was mostly sockeye.

In addition to the above salmon species, small numbers (<400) of steelhead, cutthroat trout and unidentified salmon were caught in the Strait of Georgia in 1985, bringing the total salmonid catch to 1,062,939 pieces (Appendix B-6).

The average number of total salmon caught during each boat trip in 1985 was 1.7 (Table 5). This represents a better catch success for salmon than during the 1981 to 1984 period when between 1.0 and 1.3 salmon per boat trip were reported (Shardlow and Collicutt 1989).

In 1985, as in previous years, more salmon were landed and more effort was expended in Area 13 than in any other Statistical Area (Table 4, Fig. 11). Boaters fishing in Area 13 had an average catch of 2.4 salmon per trip. Area 14, as in previous years, recorded the greatest number of salmon hooked and released (178,199), with Area 13 next at 148,031 pieces (Appendix B-7). These two areas have major coho fisheries characterized by the release of many sub-legal coho.

3.22 Groundfish

While salmon accounted for the majority of the total finfish sport catch in the Strait of Georgia in 1985, the groundfish catch of 274,426 pieces made up 21% of the overall catch (Tables 3 and 4). The species composition of the groundfish catch, based on the Table 4 data, was as follows:

Groundfish species	Catch	% Of total groundfish catch	Major catch Area
Rockfish (*Sebastes* spp.)	134,112	49%	16, 17
Lingcod (*Ophiodon elongatus*)	77,103	28%	13, 16
Dogfish (*Squalus acanthias*)	4,680	2%	16, 14
Other finfish (Appendix D)	58,531	21%	18
Total	274,426	100%	

The majority of the groundfish catch was taken in the summer months, reflecting the seasonal change in fishing effort (Table 3, Fig. 4). Catch by Statistical Area for rockfish was highest in Area 16 (29% of total) and Area 17 (16%, Table 4). Lingcod were caught mainly in Areas 13 and 16 (48% of total for the combined Areas), while the largest dogfish catch came from Areas 16 and 14 (47% of total for the combined Areas, Table 4). Area 18 produced the largest catch of other finfish (29% of total).

Rockfish species were identified for the entire survey area for the second consecutive year in 1985(Table 6). Applying the identification results to the 1985 rockfish catch estimates (Table 7) showed the following species dominance:

Rockfish species	Catch	% Of total rockfish catch	Major catch Area
Quillback	52,942	39%	16, 13
Copper	21,301	16%	17
Yelloweye	13,111	10%	16
Black	1,816	1%	19 B+
Other	44,942	34%	17
Total	134,112	100%	

The above "other" rockfish category consisted of tiger, yellowtail, china, canary and unidentified species. The 1985 rockfish species composition and the major catch area per species were similar to the 1984 results (Shardlow and Collicutt 1989).

The catch success (CPE) for rockfish was relatively constant throughout the year and averaged 0.2 fish per boat trip (Table 5). For lingcod, the average catch success was 0.1 fish per boat trip. The catch success for all non-salmon species averaged 0.4 fish per boat trip and was also relatively constant throughout the year. Catch success for total finfish during 1985 was 2.1 fish per boat trip (Table 5). This is higher than in 1983 and 1984 when 1.8 and 1.9 finfish per boat trip respectively, were reported (Shardlow et al. 1989, Shardlow and Collicutt 1989).

3.3 BIOLOGICAL DATA

3.31 Proportion and Catch of Marked Chinook and Coho

In 1985, 14,498 chinook and 38,196 coho were examined for adipose fin clip marks. Tables 8 and 9 show the observed numbers of marked chinook and coho respectively, by month and region. Data were presented by region since some Statistical Areas had insufficient numbers of fish examined for marks in some months, and those data were included with other Areas. Three regions were defined: the North Gulf represented by Areas 13-16; the South Gulf represented by Areas 17, 18, 28, 29 and the Saanich Inlet portion of Area 19 (Area 19A); and the Victoria region represented by the remainder of Area 19 (Area 19B+) (Fig. 2).

Among chinook examined for marks, 1.9% had adipose fin clips. The largest observed proportion of chinook marks was in the North Gulf catch (0.023) and the lowest proportion in the Victoria catch (0.010, Table 8). Among coho examined for marks, 5.9% had adipose fin clips. The largest observed proportion of coho marks was in the South Gulf catch (0.066), and the lowest proportion in the Victoria catch (0.033, Table 9). Monthly catch estimates of marked chinook and coho are shown by region in Tables 10 and 11 respectively. The seasonal recovery pattern of marked chinook and coho salmon was generally similar to that observed in 1983 (Shardlow et al. 1989) and 1984 (Shardlow and Collicutt 1989). However, in 1985, the estimated catch of marked coho was higher in the North Gulf (Table 11) compared to the previous two years.

3.32 Catch-At-Age for Chinook

During 1985, 1,627 chinook biosamples were collected for age and length analysis. Table 12 shows the monthly number and percent age composition of chinook sampled for age. These data are summarized graphically in Figure 12. The monthly age proportions were applied to the estimated monthly chinook catches to provide breakdown by age group (Table 13). In 1985, the majority of chinook sport catch in the Strait of Georgia consisted of age 3 fish (70.8%), followed by age 4 (20.6%), age 2 (6.6%) and age 5 or older (2.0%). By comparison, the dominant age groups in the two previous years were ages 2 and 3:

Catch year	% Age composition of chinook				Reference
	Age 2	Age 3	Age 4	Age 5	
1983	57.1	25.5	14.2	3.1	Shardlow et al. (1989)
1984	21.6	67.3	9.4	1.7	Shardlow and Collicutt (1989)
1985	6.6	70.8	20.6	2.0	This report.

Figure 12 and Table 12 show a shift in the age composition of sampled chinook and hence of chinook catch, between the first eight months and the remainder of the year. From January to August the catch was dominated by age 3 and 4 fish. From September to December the age 2 class strengthened somewhat, but not as much as in previous years (Shardlow et al. 1989, Shardlow and Collicutt 1989), so that the age 3 class remained dominant (Table 12). The relatively low proportion of age 2 chinook in July to December catches was likely the result of poor age 2 recruitment to the sport fishery. Age 2 chinook generally reach the minimum legal size limit of 45 cm in Juiy (Argue et al. 1983).

3.33 Mean Length-At-Age for Chinook

Table 14 shows the mean nose-fork length at age for the 1,627 chinook for which both length and age data were available. Figure 13 shows the length frequency distribution for all the measured chinook (2,056 aged and unaged fish). The largest portion of measured chinook (885 fish or 43% of the total sample) was in the 55-64 cm length category. This is consistent with the large catch proportion of age 3 fish (Table 13) which were found to have an annual mean length of 60.3 cm (Table 14). Of the total chinook measured in 1985, 2%

were sub-legal in size (less than 45 cm) compared to 7% in 1983 (Shardlow et al. 1989) and 4% in 1984 (Shardlow and Collicutt 1989). In 1985, most of the sub-legal coho were landed in August and September. Age 2 chinook showed a consistent growth trend from May through December when the mean length increased from 34.0 cm to 55.6 cm (Table 14). The largest chinook sampled (99 cm) was landed at Cheanuh Marina in Area 19 on July 25, 1985, and was 5 years old.

4.0 SUMMARY

A sport fishery creel survey was conducted in the Strait of Georgia in 1985 in order to estimate the catches of all the important recreational finfish species and the total sport fishing boat trips. The numbers of chinook and coho salmon with adipose fin clips were also estimated. These data are presented by month and Statistical Area. Monthly age and length compositions of chinook catch are also shown.

In 1985, a total of 39,801 boating parties were interviewed at 31 landing locations in the Strait of Georgia creel survey area. The 33,494 fishing interviews conducted represents approximately 5% of the total number of boat trips conducted by sport fishermen in the Strait of Georgia in 1985. A total of 69 overflights were also conducted to take "snapshot" counts of fishing effort.

In 1985, sport fishermen made an estimated 628,513 boat trips in the Strait of Georgia and landed an estimated total finfish catch of 1,337,000 pieces of which 79% were salmon and 21% were groundfish. The 1,063,000 landed salmon consisted of 728,000 coho, 235,000 chinook, 91,000 pink salmon and 8,000 combined chum and sockeye. An additional 703,000 salmon of mixed species were released by anglers.

The 274,000 landed groundfish consisted of 134,000 rockfish, 77,000 lingcod, 5,000 dogfish and 59,000 other finfish. Rockfish catches were identified as quillback (39% of rockfish catch), copper (16%), yelloweye (10%), and black (1%); the remaining 34% of the rockfish catch consisted of tiger, yellowtail, china, canary and unidentified species.

Catch success per boat trip averaged 1.7 salmon (all species) and 0.4 groundfish.

Among salmon examined for marks, 1.9% of chinook and 5.9% of coho had adipose fin clips. The majority of chinook sport catch in 1985 consisted of age 3 fish (70.8%), followed by age 4 (20.6%), age 2 (6.6%) and age 5 or older (2.0%). Of the total chinook measured in 1985, 2% were sub-legal in size (less than 45 cm).

5.0 ACKNOWLEDGMENTS

The authors wish to thank Tom Hoyt for his contribution to program management. We acknowledge the creel survey staff of DPA Consulting Ltd., particularly Gordon Gislason, Geoffrey Ziess and Susan Hamilton, for their valuable constribution to creel survey operations and data collection and assembly. We are grateful to private marina and boat ramp owners for their valuable assistance and cooperation as well as to the thousands of anglers who participated in the survey. We also thank Carmen McConnell and Brenda Hoitsma for assistance in preparation of tables and figures, Alice Fedorenko for editing the report and preparing it for publication, and the DFO Word Processing Unit for typing the drafts.

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FIGURES

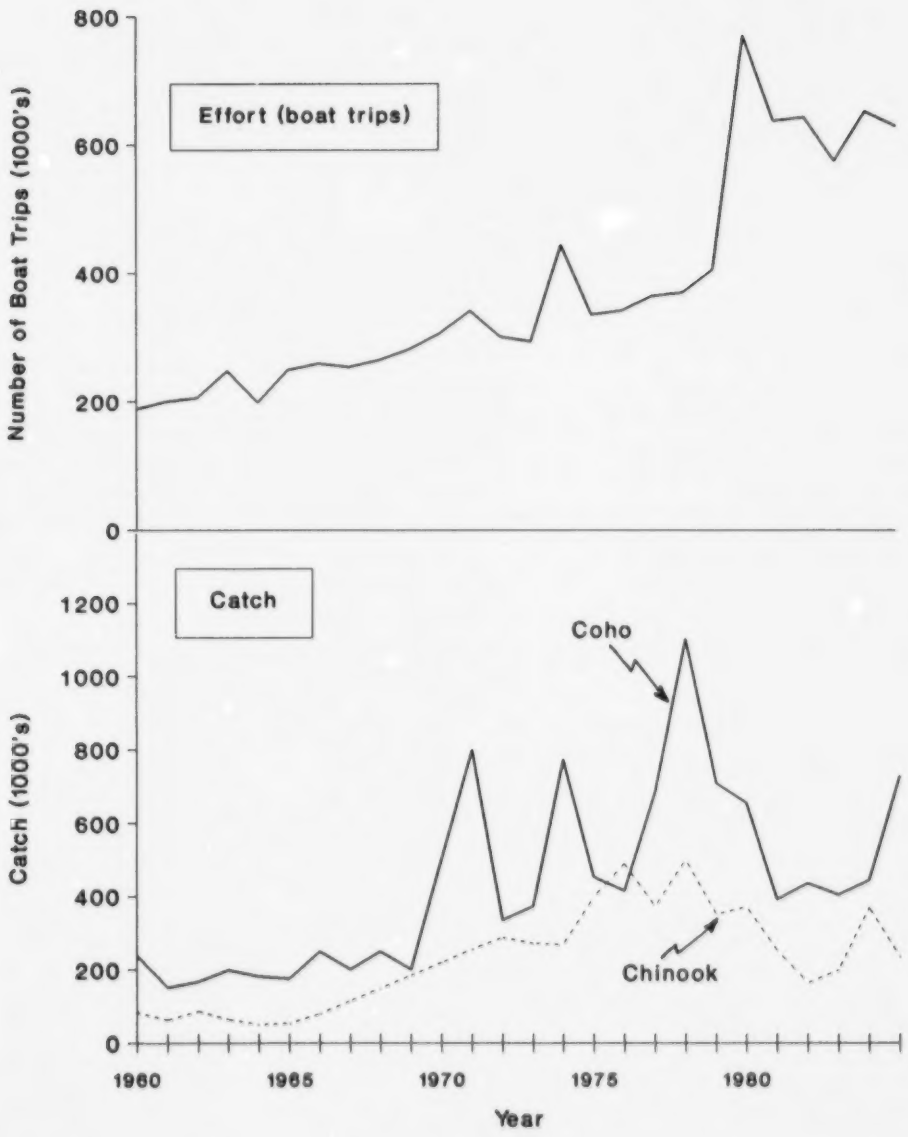

Figure 1. Tidal effort statistics and sport catches of coho and chinook salmon for the Strait of Georgia, 1960 - 1985.

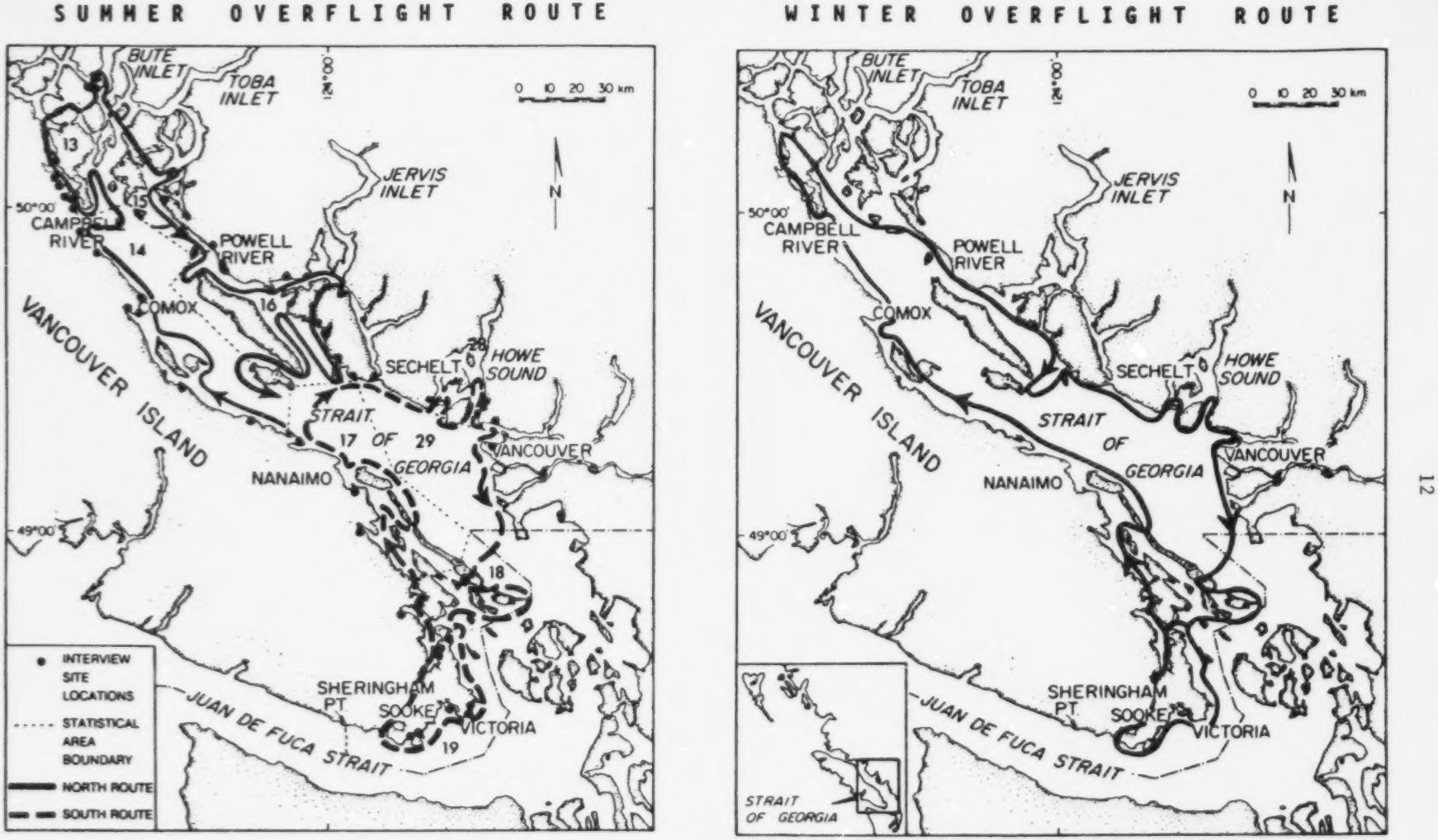

Figure 2. Interview site locations, and summer and winter overflight routes, Strait of Georgia, 1985.

STRAIT OF GEORGIA SPORT FISHING CREEL SURVEY N° 16080

Landing Area: _____/_____ Statistical Area: _____

Interviewer: _____/_____ Date: ___/___/___ (YR/MO/DAY) TIME (INT) ____:____ AM PM

PRESENT BOAT TRIP COMPLETED

1. Total Number of Individuals in Party: ☐

2. Time of Landing: ____:____ AM PM Time Block: ☐

3. Was Your Party Sport Fishing on This Trip: YES NO

4. Guided: YES NO

5. Residences of Party: B.C. ☐ Rest of Canada ☐ Other ☐

6. Length of Boat Trip: ☐ HRS.

7. Times Lines were in the Water: (EXCLUDE time not fishing)

AM			PM	
☐ (1) before 7:00	☐ (5) 10:00-10:59	☐ (9) 2:00-2:59		☐ (13) 6:00-6:59
☐ (2) 7:00-7:59	☐ (6) 11:00-11:59	☐ (10) 3:00-3:59		☐ (14) 7:00-7:59
☐ (3) 8:00-8:59	☐ (7) 12:00-12:59	☐ (11) 4:00-4:59		☐ 15) 8:00-8:59
☐ (4) 9:00-9:59	☐ (8) 1:00- 1:59	☐ (12) 5:00-5:59		☐ (16) 9:00-plus

8. Average Number of Lines in the Water for TOTAL boat Party: ☐

9. CATCH SUMMARY

	1ST SUB AREA	2ND SUB AREA	3RD SUB AREA
GO TO MAP:			
KEPT:			
RELEASED:			
TIME:	HRS.	HRS.	HRS.

Total Catch for Trip: ☐

Total Time Fishing: ☐ HRS.

MARKED: ☐ UNMARKED: ☐

COHO AND CHINOOK ONLY

10. How much Fishing Time was Directed at Each of the Following?

CO ☐ CN ☐ SM ☐ LC ☐ RF ☐

GF ☐ SF ☐ OTHER ☐

11. Did you encounter any problems with seals, sea lions, or whales on today's fishing trip? YES NO

Figure 3. Sample of 1985 interview form.

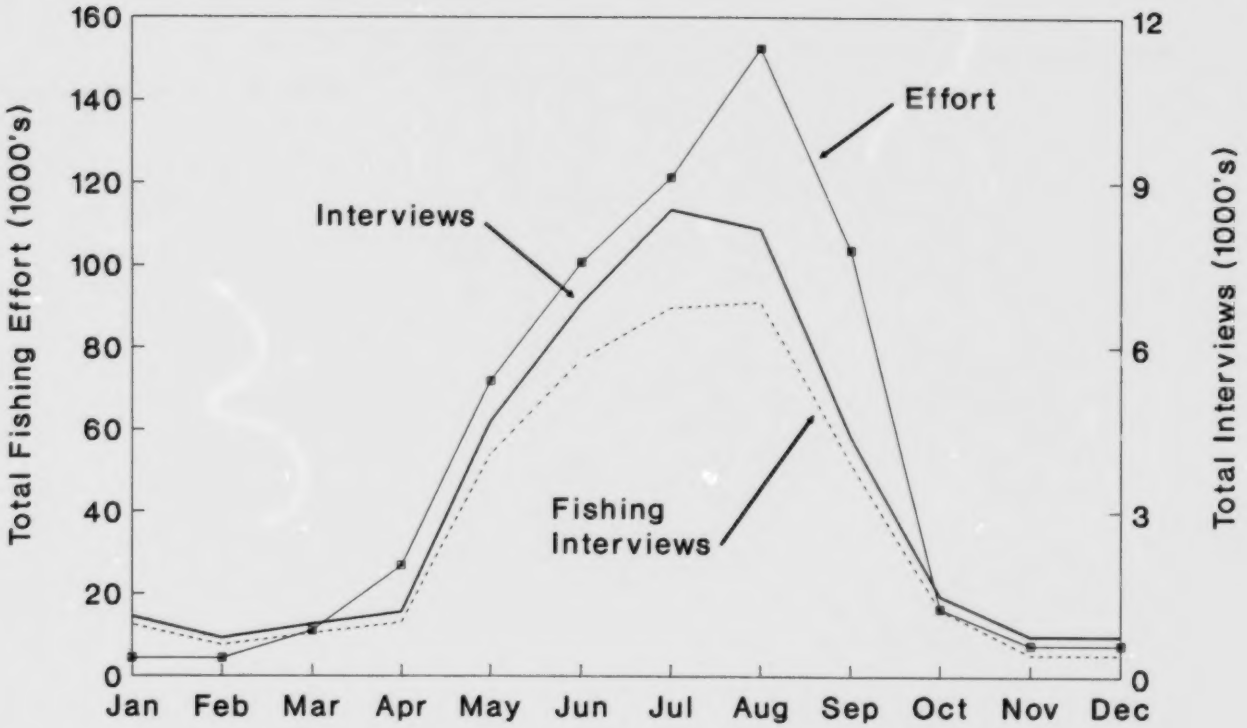

Figure 4. Comparison of monthly total fishing effort, monthly total interviews and monthly total fishing interviews, Strait of Georgia, 1985.

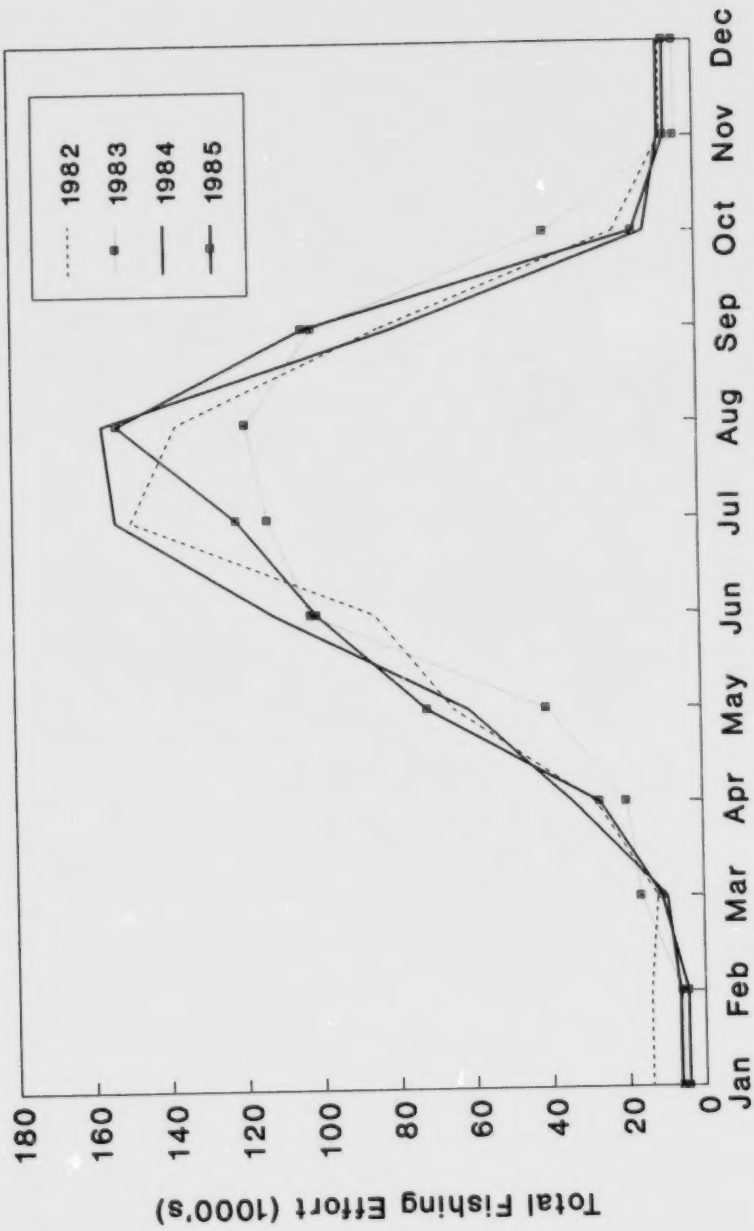

Figure 5. Monthly fishing effort estimates (number of boat trips) for the Strait of Georgia sport fishery, 1982 - 1985.

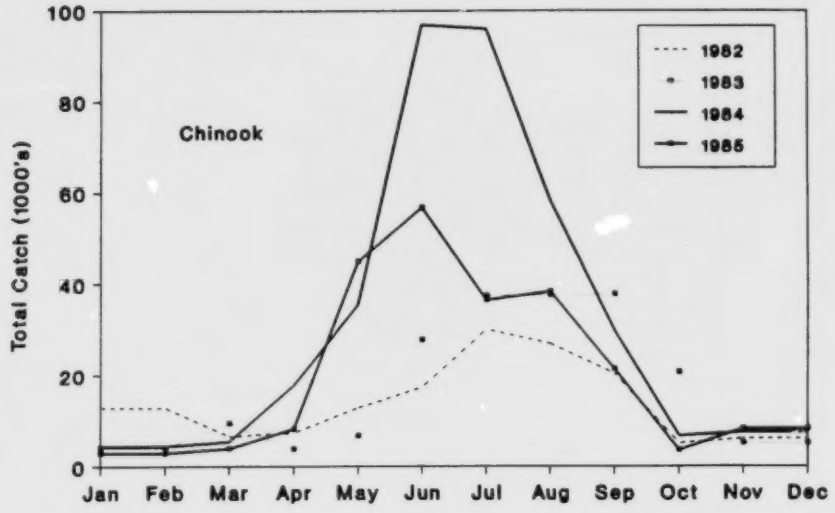

Figure 6. Monthly chinook catch for the Strait of Georgia sport fishery, 1982 - 1985.

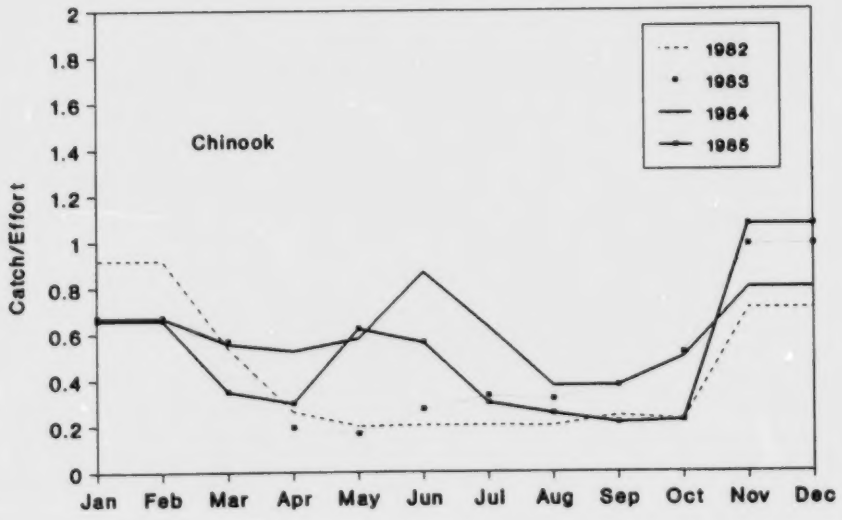

Figure 7. Monthly chinook catch per boat trip for the Strait of Georgia sport fishery, 1982 - 1985.

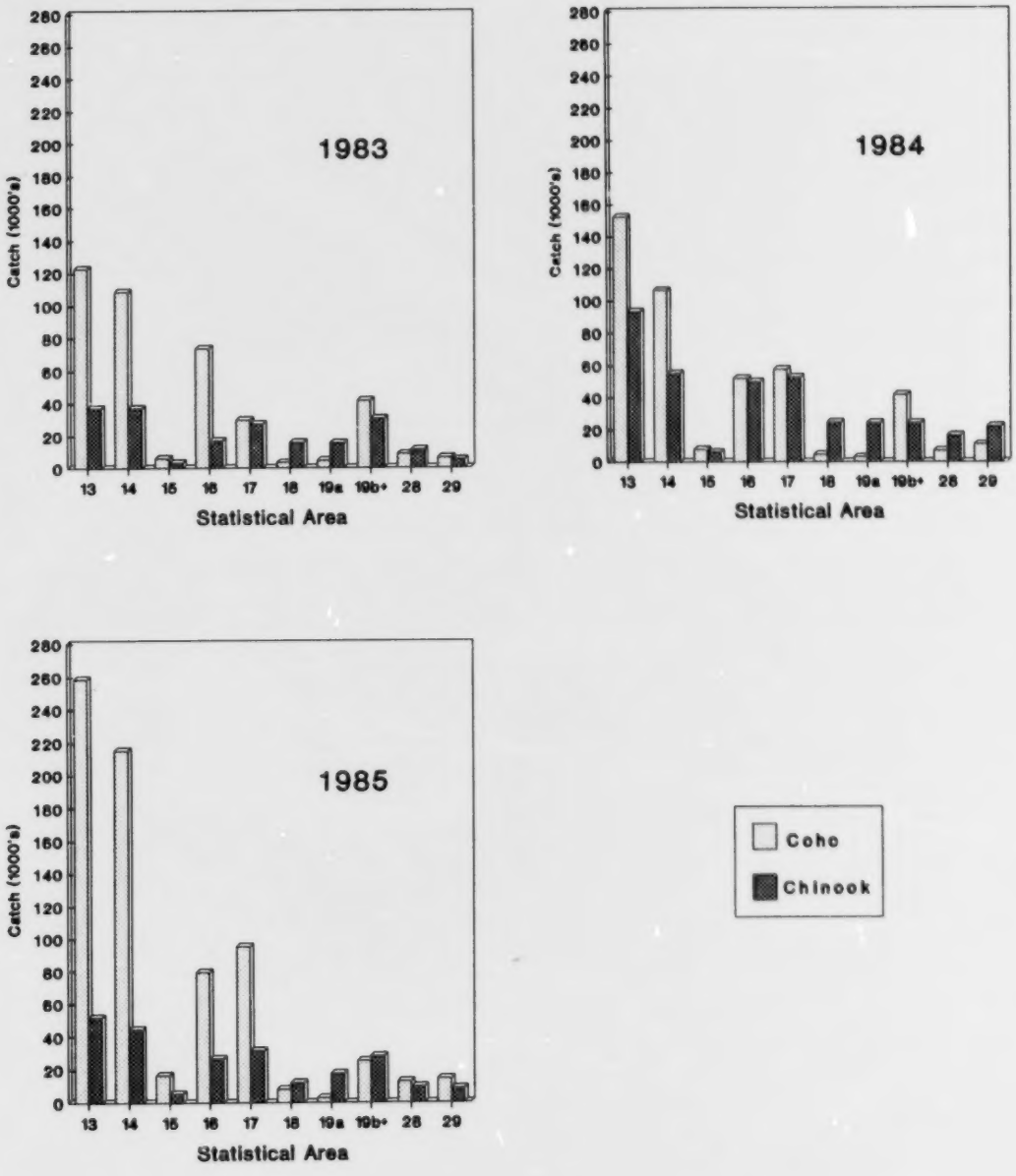

Figure 8. Annual sport catches of chinook and coho salmon by Statistical Area in the Strait of Georgia, 1983 - 1985.

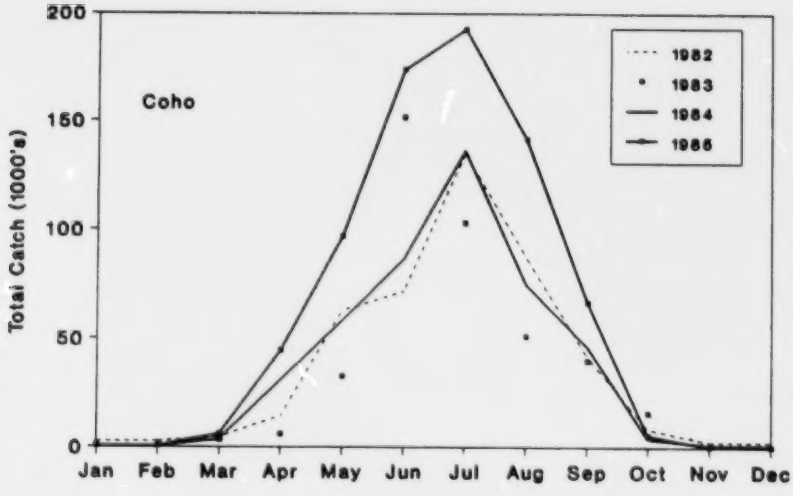

Figure 9. Monthly coho catch for the Strait of Georgia sport fishery, 1982 - 1985.

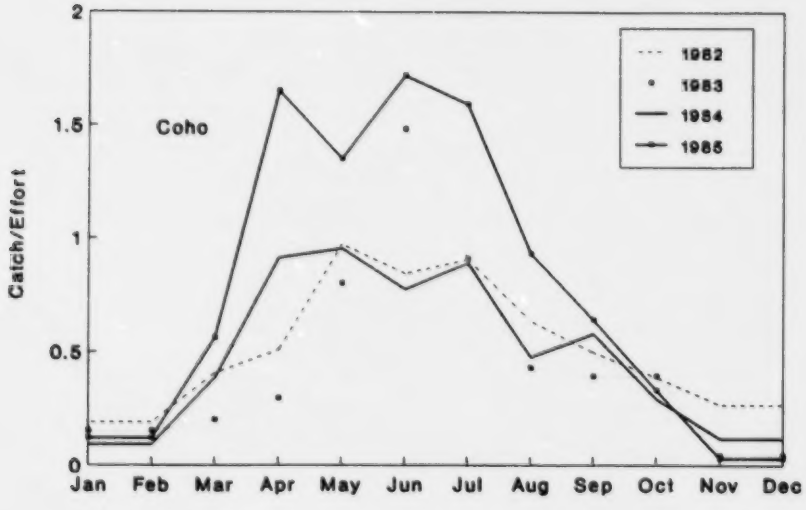

Figure 10. Monthly coho catch per boat trip for the Strait of Georgia sport fishery, 1982 - 1985.

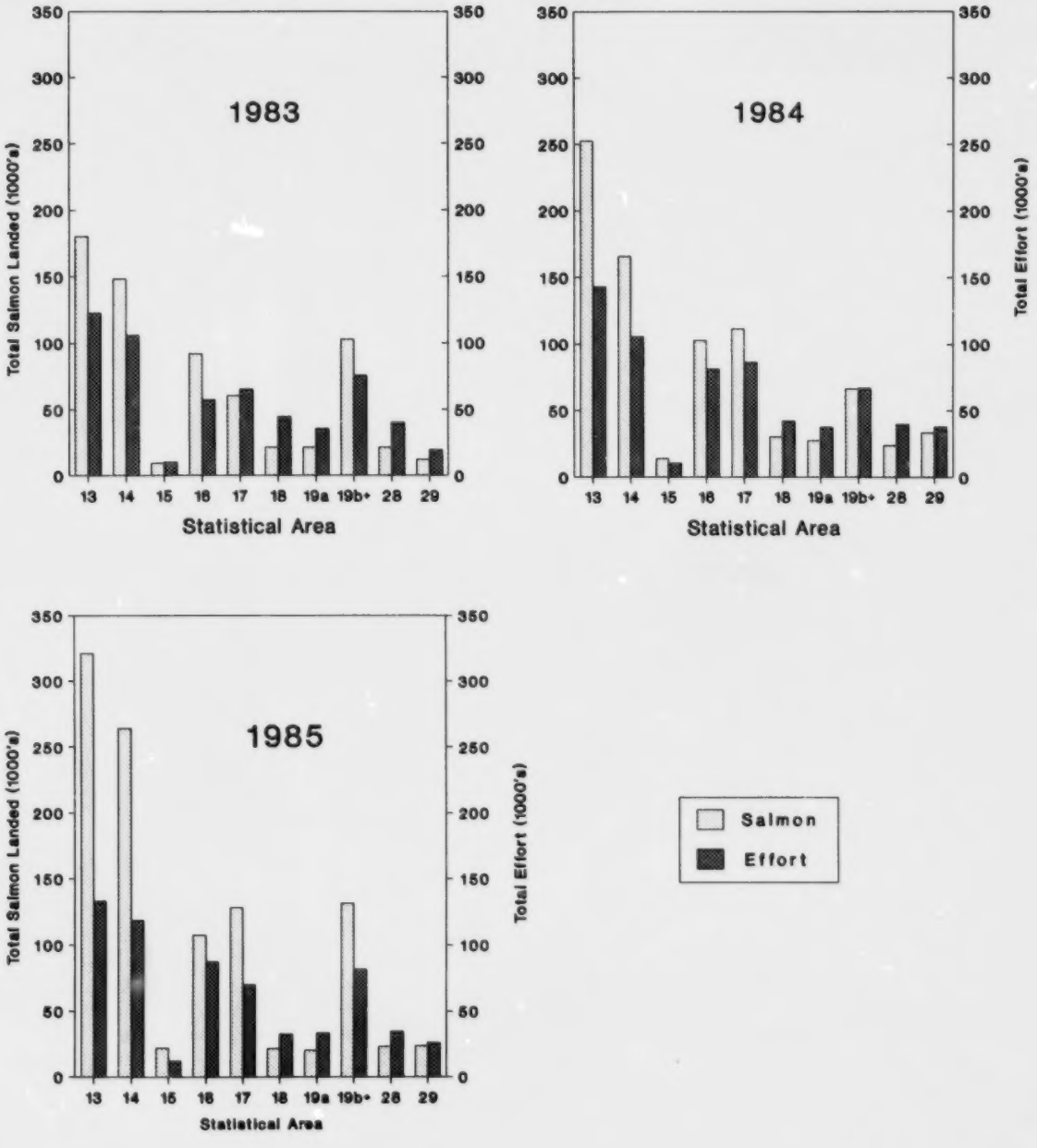

Figure 11. Total salmon landed and total fishing effort expended by Statistical Area in the Strait of Georgia sport fishery, 1983 - 1985.

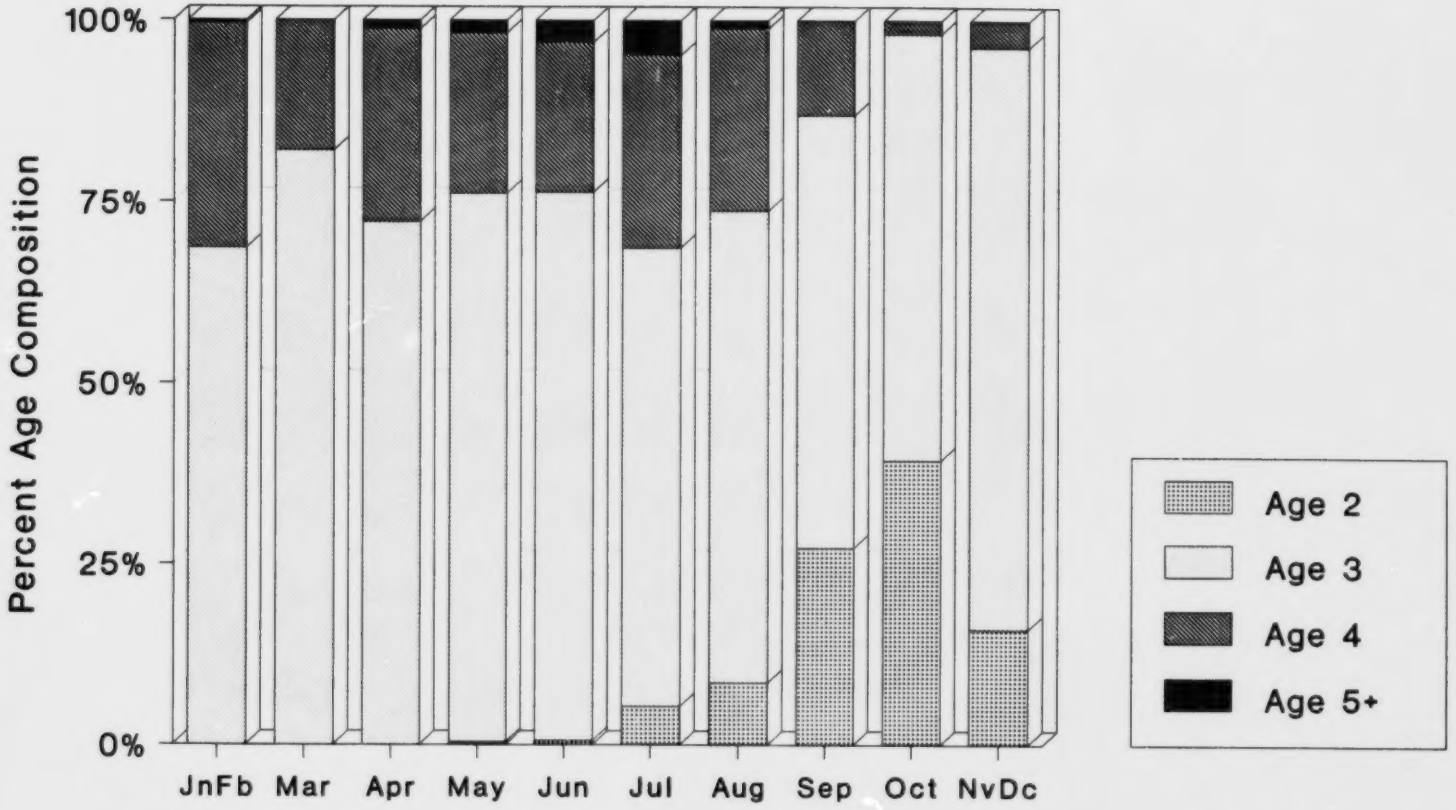

Figure 12. Monthly percent age composition of chinook salmon sampled in the Strait of Georgia Creel Survey, 1985.

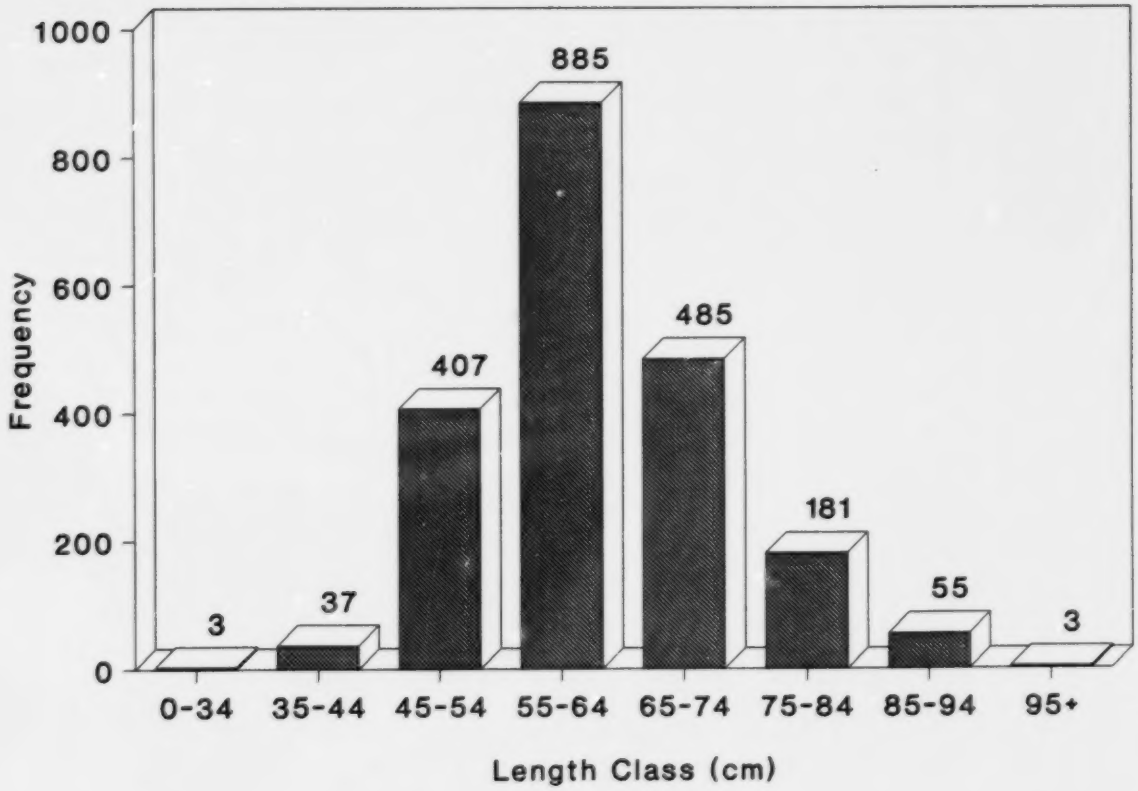

Figure 13. Length frequency distribution of chinook salmon sampled in the Strait of Georgia Creel Survey, 1985.

TABLES

Table 1. Tidal effort statistics and sport catches of coho chinook salmon for the Strait of Georgia, 1960 - 1985.*

Year	Effort (boat trips)	Catch	
		Coho	Chinook
1960	189,150	238,000	83,000
1961	199,935	152,000	63,000
1962	205,547	167,000	86,000
1963	247,590	199,000	65,000
1964	198,120	182,000	51,000
1965	250,020	175,000	53,000
1966	259,100	249,000	80,000
1967	254,500	200,000	115,000
1968	265,030	250,000	150,000
1969	281,475	200,000	185,000
1970	306,255	500,000	220,000
1971	341,123	800,000	255,000
1972	300,349	335,000	287,000
1973	293,141	373,000	272,000
1974	443,441	772,000	269,000
1975	334,490	454,000	398,000
1976	340,729	415,000	490,000
1977	363,350	682,000	372,000
1978	369,035	1,103,000	500,000
1979	404,710	708,735	350,000
1980	769,000	655,000	371,000
1981	637,000	391,200	253,300
1982	642,200	436,090	163,793
1983	574,257	404,031	198,433
1984	651,090	443,590	369,445
1985	628,513	728,197	234,838

* Source: Coho catch statistics: 1960-1978 from Argue et al. (1983), 1979 from R. Kadowaki (pers. comm.), 1980-1982 from Shardlow et al. (MS 1989), 1983 from Shardlow et al. (1989), 1984 from Shardlow and Collicutt (1989).
Chinook catch statistics: 1960-1977 from Argue et al. (1983), 1978 and 1979 from B. Riddell (pers. comm.) following the methods of Argue et al. (1983), 1980-1982 from Shardlow et al. (MS 1989), 1983 from Shardlow et al. (1989), 1984 from Shardlow and Collicutt (1989).
Effort statistics: 1960-1979 from annual published and unpublished Fisheries Officer statistics, 1980-1982 from Shardlow et al. (MS 1989), 1983 from Shardlow et al. (1989), 1984 from Shardlow and Collicutt (1989).

Table 2. Number of fishing interviews by month and Statistical Area, Strait of Georgia, 1985.

	Statistical Area											
Month	13	14	15	16	17	18	19A	19B+	28	29	Total	Over-flights
Jan+Feb	10	17	0	239	78	50	37	588	207	284	1,510	4
Mar	4	67	0	103	92	18	33	317	64	86	784	4
Apr	8	150	0	180	262	19	34	199	65	62	979	4
May	203	720	0	1,059	664	54	307	341	522	173	4,043	7
Jun	792	1,216	67	986	613	126	351	815	569	252	5,787	10
Jul	1,360	1,142	113	1,073	464	56	354	1,048	791	292	6,693	12
Aug	1,582	1,200	53	744	648	124	294	1,075	466	649	6,835	9
Sep	755	707	0	566	508	116	267	972	274	205	4,370	8
Oct	89	132	0	145	105	87	177	353	83	31	1,202	6
Nov+Dec	7	30	0	241	40	50	45	682	47	149	1,291	5
Total	4,810	5,381	233	5,336	3,474	700	1,899	6,390	3,088	2,183	33,494	69

Table 3. Fishing effort and catch by species and month, Strait of Georgia, 1985.

Month		Effort No. Boat Trips	Coho	Chinook	Pink	Other + Salmon	Rock-Fish	Lingcod	Dog-Fish	Other Finfish	Total Finfish
Jan+Feb	Estimate	8,781	1,072	5,836	0	16	2,337	15 *	19	654	9,949
	S.E.	610	279	640	0	17	539	5	7	132	892
Mar	Estimate	11,066	6,202	3,901	0	0	2,956	106 *	108	6,088	19,361
	S.E.	821	1,071	558	0	0	861	48	43	1,964	2,462
Apr	Estimate	26,859	44,272	8,185	0	0	5,445	3,047	0	1,521	62,470
	S.E.	1,700	3,390	843	0	0	934	713	0	491	3,718
May	Estimate	71,817	96,789	44,809	104	36	16,471	16,992	513	2,029	177,743
	S.E.	4,921	8,846	3,250	43	13	1,845	2,136	173	386	9,847
Jun	Estimate	100,667	173,635	56,492	700	100	23,822	15,276	688	19,547	290,260
	S.E.	3,803	9,855	2,578	125	42	1,884	1,023	164	4,255	11,248
Jul	Estimate	121,383	192,520	36,208	1,483	552	26,096	14,596	1,072	4,463	276,990
	S.E.	3,092	6,561	1,342	119	110	1,455	690	164	414	6,904
Aug	Estimate	152,554	141,475	38,144	51,833	1,940	28,936	13,829	548	10,182	286,887
	S.E.	4,891	5,141	1,910	6,794	279	1,755	869	124	1,122	9,024
Sep	Estimate	103,605	66,370	21,275	36,378	1,883	20,911	10,217	1,515	8,650	167,199
	S.E.	4,455	3,914	1,179	4,702	265	2,072	1,110	506	1,109	6,775
Oct	Estimate	16,436	5,460	3,553	748	1,558	5,221	2,583	207	3,180	22,510
	S.E.	1,099	637	388	216	249	620	318	60	637	1,249
Nov+Dec	Estimate	15,345	402	16,435	0	2,234	1,917	442 *	10	2,217	23,657
	S.E.	2,374	166	4,607	0	1,014	427	146	8	897	4,826
Total	Estimate	628,513	728,197	234,838	91,246	8,319	134,112	77,103	4,680	58,531	1,337,026 **
	S.E.	10,138	16,532	6,845	8,267	1,119	4,349	2,951	601	5,123	21,071

+ Includes sockeye and chum salmon.

* A total closure for lingcod was in effect from January 1 to April 15, and November 15 to December 31. Reported figures most likely represent illegal catches by anglers.

** In addition, an estimated 339 steelhead, cutthroat trout and unidentified salmon were caught by sport fishermen.

Table 4. Fishing effort and catch by species and Statistical Area, Strait of Georgia, 1985.

Statistical Area		Effort No. Boat Trips	Coho	Chinook	Pink	Other + Salmon	Rock-Fish	Lingcod	Dog-Fish	Other Finfish	Total Finfish	
13	Estimate	132,934	258,627	51,662	8,508	2,442	14,416	23,177	108	2,931	361,871	
	S.E.	5,689	12,618	2,914	1,119	330	1,522	2,158	41	437	13,275	
14	Estimate	118,224	215,116	44,245	3,166	1,457	12,397	6,194	1,054	6,834	290,463	
	S.E.	4,331	8,202	2,140	351	568	1,076	442	420	704	8,621	
15	Estimate	12,095	16,329	5,436	70	10	1,712	858	5	112	24,532	
	S.E.	795	1,191	425	22	10	232	120	3	43	1,292	
16	Estimate	87,292	79,650	26,463	852	298	38,544	13,984	1,141	4,365	165,297	
	S.E.	2,979	3,208	1,848	176	65	2,657	982	321	766	4,739	
17	Estimate	69,868	95,294	31,480	696	328	20,857	8,863	492	10,386	168,396	
	S.E.	2,736	5,235	1,908	107	68	1,612	965	133	2,251	6,299	
18	Estimate	32,448	8,071	11,992	250	1,419	12,123	5,283	325	16,790	56,253	
	S.E.	1,519	622	1,081	44	850	1,546	640	100	3,891	4,498	
19A	Estimate	33,244	2,752	17,631	101	97	5,619	2,361	88	3,310	31,959	
	S.E.	1,884	324	1,480	69	47	935	369	42	1,176	2,167	
19B+	Estimate	81,824	25,304	27,843	76,347	1,759	14,683	10,649	390	8,574	165,549	
	S.E.	4,861	2,095	4,527	8,179	279	1,228	1,089	169	1,712	9,875	
28	Estimate	34,414	12,560	9,513	684	342	7,201	3,068	670	3,121	37,159	
	S.E.	1,624	911	950	109	92	726	286	125	488	1,617	
29	Estimate	26,170	14,494	8,573	572	167	6,560	2,666	407	2,108	35,547	
	S.E.	1,597	1,417	1,341	116	45	653	358	84	448	2,141	
Total	Estimate	628,513	728,197	234,838	91,246	8,319	134,112	77,103	4,680	58,531	1,337,026	*
	S.E.	10,138	16,532	6,845	8,267	1,120	4,349	2,950	602	5,122	21,071	

+ Includes sockeye and chum salmon.

* In addition, an estimated 339 steelhead, cutthroat trout and unidentified salmon were caught by sport fishermen.

Table 5. Monthly catch success (catch per boat trip) by species, Strait of Georgia, 1985. *

Month	Coho	Chinook	Total ** Salmon	Rock-Fish	Lingcod	Total Non-Salmon	All Finfish
Jan+Feb	0.12	0.66	0.79	0.27	0.00	0.34	1.13
Mar	0.56	0.35	0.91	0.27	0.01	0.84	1.75
Apr	1.65	0.30	1.95	0.20	0.11	0.37	2.33
May	1.35	0.62	1.97	0.23	0.24	0.50	2.47
Jun	1.72	0.56	2.29	0.24	0.15	0.59	2.88
Jul	1.59	0.30	1.90	0.21	0.12	0.38	2.28
Aug	0.93	0.25	1.53	0.19	0.09	0.35	1.88
Sep	0.64	0.21	1.22	0.20	0.10	0.40	1.61
Oct	0.33	0.22	0.69	0.32	0.16	0.68	1.37
Nov+Dec	0.03	1.07	1.24	0.12	0.03	0.30	1.54
Total	1.16	0.37	1.69	0.21	0.12	0.44	2.13

* Calculated using Table 3 data.

** Includes coho, chinook, pink, chum and sockeye.

Table 6. Identification of rockfish by species in each Statistical Area, Strait of Georgia, 1985.

Species	Statistical Area										Total Sample
	13	14	15	16	17	18	19A	19B+	28	29	
Quillback (Sebastes maliger)	303	120	6	797	195	98	153	338	194	66	2,270
Copper (S. caurinus)	33	35	0	127	212	127	63	248	94	21	960
Yelloweye (S. ruberrimus)	15	64	6	235	101	8	22	29	55	21	556
Black (S. melanops)	0	8	0	0	4	0	0	91	14	0	117
Tiger (S. nigrocinctus)	4	1	0	38	11	2	2	5	6	0	69
Yellowtail (S. flavidus)	0	20	0	10	0	0	0	1	5	0	36
China (S. nebulosus) *	0	0	0	0	0	0	0	0	0	0	0
Canary (S. pinniger) *	0	0	0	0	0	0	0	0	0	0	0
Unidentified	56	210	25	418	217	156	73	286	320	163	1,924
Total sample	411	458	37	1,625	740	391	313	998	688	271	5,932

* China and canary species were not observed during the 1985 identification program, but were reported for the study area in other years.

Table 7. Estimated catch of rockfish by species and Statistical Area, Strait of Georgia, 1985. *

Species		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Quillback	Catch	10,628	3,248	278	18,904	5,496	3,039	2,747	4,973	2,031	1,598	52,942
	S.D.	1,165	381	111	1,388	543	471	484	471	239	234	2,127
Copper	Catch	1,157	947	0	3,012	5,975	3,938	1,131	3,649	984	508	21,301
	S.D.	230	175	0	331	578	580	228	366	137	118	1,040
Yelloweye	Catch	526	1,732	278	5,574	2,847	248	395	427	576	508	13,111
	S.D.	145	251	111	511	344	93	105	86	95	118	725
Black	Catch	0	217	0	0	113	0	0	1,339	147	0	1,816
	S.D.	0	78	0	0	57	0	0	175	42	0	204
Other **	Catch	2,105	6,253	1,156	11,054	6,426	4,898	1,346	4,295	3,463	3,946	44,942
	S.D.	941	955	169	2,182	1,359	1,350	758	1,054	663	585	3,568
Total	Catch	14,416	12,397	1,712	38,544	20,857	12,123	5,619	14,683	7,201	6,560	134,112
	S.D.	1,522	1,076	231	2,657	1,612	1,546	934	1,227	725	652	4,348

* Calculated using data from Table 6 and Appendix B-8.

** Other includes tiger, yellowtail, china, canary and unidentified rockfish.

Table 8. Monthly number of marked chinook observed by region, Strait of Georgia, 1985.

Month		North Gulf	South Gulf	Victoria	Total Sample
Jan+Feb	Obs *	7	8	4	19
	Insp **	182	538	522	1,242
Mar	Obs	2	1	0	3
	Insp	81	175	66	322
Apr	Obs	2	1	0	3
	Insp	167	227	63	457
May	Obs	30	23	1	54
	Insp	1,489	1,351	91	2,931
Jun	Obs	40	22	3	65
	Insp	1,804	937	309	3,050
Jul	Obs	25	9	4	38
	Insp	1,235	346	382	1,963
Aug	Obs	24	4	1	29
	Insp	963	364	205	1,532
Sep	Obs	19	8	3	30
	Insp	503	303	152	958
Oct	Obs	3	2	3	8
	Insp	109	91	99	299
Nov+Dec	Obs	7	1	12	20
	Insp	361	93	1,290	1,744
Total	Obs	159	79	31	269
	Insp	6,894	4,425	3,179	14,498
Proportion of marks		0.023	0.018	0.010	0.019

* Obs - marks observed.
** Insp - fish inspected.

Table 9. Monthly number of marked coho observed by region, Strait of Georgia, 1985.

Month		North Gulf	South Gulf	Victoria	Total Sample
Jan+Feb	Obs *	2	1	3	6
	Insp **	21	32	145	198
Mar	Obs	8	2	21	31
	Insp	272	47	490	809
Apr	Obs	34	51	5	90
	Insp	1,030	943	92	2,065
May	Obs	177	128	0	305
	Insp	3,105	2,158	11	5,274
Jun	Obs	505	47	8	560
	Insp	8,604	1,327	151	10,082
Jul	Obs	444	97	18	559
	Insp	8,291	1,339	490	10,120
Aug	Obs	356	159	5	520
	Insp	4,729	1,482	226	6,437
Sep	Obs	132	28	10	170
	Insp	1,965	400	451	2,816
Oct	Obs	12	4	0	16
	Insp	199	68	82	349
Nov+Dec	Obs	0	0	2	2
	Insp	6	1	39	46
Total	Obs	1,670	517	72	2,259
	Insp	28,222	7,797	2,177	38,196
Proportion of marks		0.059	0.066	0.033	0.059

* Obs - marks observed.

** Insp - fish inspected.

Table 10. Monthly estimated catch of marked chinook by region, Strait of Georgia, 1985. *

Month		North Gulf	South Gulf	Victoria	Total
Jan+Feb	Catch	16	47	17	80
	S.D.	7	18	9	21
Mar	Catch	12	17	0	29
	S.D.	9	17	0	19
Apr	Catch	26	23	0	49
	S.D.	20	23	0	30
May	Catch	412	396	12	820
	S.D.	88	91	13	127
Jun	Catch	794	423	26	1,243
	S.D.	133	96	16	165
Jul	Catch	510	172	46	728
	S.D.	104	58	23	121
Aug	Catch	597	106	22	725
	S.D.	126	54	23	139
Sep	Catch	431	198	46	675
	S.D.	102	72	29	128
Oct	Catch	52	26	15	93
	S.D.	31	19	10	38
Nov+Dec	Catch	117	18	81	216
	S.D.	53	18	48	74
Total	Catch	2,967	1,426	265	4,658
	S.D.	259	175	69	320

* Calculated using data from Table 8 and Appendix B-3.

Table 11. Monthly estimated catch of marked coho by region, Strait of Georgia, 1985. *

Month		North Gulf	South Gulf	Victoria	Total
Jan+Feb	Catch	38	4	11	53
	S.D.	39	5	7	40
Mar	Catch	50	28	165	243
	S.D.	24	21	53	62
Apr	Catch	556	1,424	60	2,040
	S.D.	111	249	36	275
May	Catch	3,884	1,687	0	5,571
	S.D.	541	261	0	601
Jun	Catch	8,986	680	71	9,737
	S.D.	687	120	31	698
Jul	Catch	8,805	1,639	201	10,645
	S.D.	531	191	51	567
Aug	Catch	8,371	2,741	105	11,217
	S.D.	561	266	50	623
Sep	Catch	3,334	654	164	4,152
	S.D.	365	138	62	395
Oct	Catch	252	51	0	303
	S.D.	80	27	0	84
Nov+Dec	Catch	0	0	13	13
	S.D.	0	0	12	12
Total	Catch	34,276	8,908	790	43,974
	S.D.	1,231	522	119	1,342

* Calculated using data from Table 9 and Appendix B-2.

Table 12. Monthly number and percent age composition of chinook sampled for age in the Strait of Georgia Creel Survey, 1985 (n gives sample size).

Month	Age 2		Age 3		Age 4		Age 5+		Total Sample
	n	%	n	%	n	%	n	%	
Jan+Feb	0	0.0%	152	68.5%	69	31.1%	1	0.5%	222
Mar	0	0.0%	64	82.1%	14	17.9%	0	0.0%	78
Apr	0	0.0%	60	72.3%	22	26.5%	1	1.2%	83
May	1	0.4%	180	75.3%	54	22.6%	4	1.7%	239
Jun	2	0.6%	258	76.1%	69	20.4%	10	2.9%	339
Jul	10	5.0%	129	64.8%	50	25.1%	10	5.0%	199
Aug	16	8.6%	121	65.1%	47	25.3%	2	1.1%	186
Sep	24	27.3%	53	60.2%	11	12.5%	0	0.0%	88
Oct	22	40.0%	32	58.2%	1	1.8%	0	0.0%	55
Nov+Dec	22	15.9%	111	80.4%	5	3.6%	0	0.0%	138
Total	97	-	1,160	-	342	-	28	-	1,627
Overall age composition of catch *	-	6.6%	-	70.8%	-	20.6%	-	2.0%	-

* Overall age composition of estimated catch based on data from Table 13.

Table 13. Monthly estimated catch at age of chinook in the Strait of Georgia, 1985. *

Month		Age 2	Age 3	Age 4	Age 5+	Total **
Jan+Feb	Catch	0	3,996	1,814	26	5,836
	S.D.	0	425	252	26	495
Mar	Catch	0	3,201	700	0	3,901
	S.D.	0	170	170	0	240
Apr	Catch	0	5,917	2,170	98	8,185
	S.D.	0	731	457	99	868
May	Catch	187	33,747	10,124	751	44,809
	S.D.	188	2,750	1,420	377	3,124
Jun	Catch	333	42,994	11,498	1,667	56,492
	S.D.	236	2,360	1,343	525	2,776
Jul	Catch	1,819	23,472	9,097	1,820	36,208
	S.D.	565	1,504	1,164	565	2,063
Aug	Catch	3,281	24,814	9,639	410	38,144
	S.D.	802	1,824	1,309	290	2,402
Sep	Catch	5,802	12,813	2,660	0	21,275
	S.D.	1,062	1,319	766	0	1,859
Oct	Catch	1,421	2,067	65	0	3,553
	S.D.	283	328	65	0	438
Nov+Dec	Catch	2,620	13,219	596	0	16,435
	S.D.	907	3,750	319	0	3,871
Total	Catch	15,463	166,240	48,363	4,772	234,838
	S.D.	1,756	5,948	2,808	912	6,844 ++
Overall Age Composition		6.6%	70.8%	20.6%	2.0%	100.0%

* Calculated by applying to total monthly chinook catch the monthly age proportions from Table 12.

** Monthly total catch from Table 3.

++ S.E.

Table 14. Monthly mean nose–fork length (L) at age of chinook sampled in the Strait of Georgia Creel Survey, 1985 (n gives sample size).

Month	Age 2		Age 3		Age 4		Age 5		Age 6		Total Sample
	L (cm)	n	L (cm)	n	L (cm)	n	L (cm)	n	L (cm)	n	
Jan+Feb	-	0	54.7	152	65.9	69	78.0	1	-	0	222
Mar	-	0	56.9	64	68.8	14	-	0	-	0	78
Apr	-	0	58.5	60	70.7	22	84.0	1	-	0	83
May	34.0	1	60.1	180	71.4	54	79.3	4	-	0	239
Jun	54.5	2	60.4	258	72.8	69	86.9	10	-	0	339
Jul	46.0	10	61.2	129	78.0	50	89.8	9	82.0	1	199
Aug	48.2	16	63.3	121	78.6	47	80.5	2	-	0	186
Sep	46.0	24	66.0	53	86.0	11	-	0	-	0	88
Oct	49.0	22	62.0	32	67.0	1	-	0	-	0	55
Nov+Dec	55.6	22	66.0	111	78.0	5	-	0	-	0	138
Total	49.2	97	60.3	1160	72.9	342	86.0	27	82.0	1	1,627

APPENDICES

APPENDIX A

METHODS AND EQUATIONS USED IN ANALYSIS OF CATCH AND EFFORT STATISTICS FOR THE STRAIT OF GEORGIA SPORT FISHERY CREEL SURVEYS, 1983-1985[1].

[1]Adapted from:

Shardlow, T. F., K. K. English, T. Hoyt, G. E. Gillespie and T. A. Calvin. 1989. Strait of Georgia Creel Survey sport fishery statistics, 1983. Can. MS Rep. Fish. Aquat. Sci. 1872 : 53 p.

METHODS AND EQUATIONS USED IN ANALYSIS OF CATCH AND EFFORT STATISTICS FOR THE STRAIT OF GEORGIA SPORT FISHERY CREEL SURVEYS, 1983 - 1985.

The description of terms, variables and subscripts used in the data analysis is given in Table A-1.

Calculation of Catch and Effort Statistics

To estimate the monthly catch and effort, three components had to be calculated from that month's data:

(1) the weighted mean daily fishing pattern from interview data,
(2) the weighted mean catch per unit effort from interview data and
(3) the mean sport count from overflight data.

The equations used to estimate the means and variances for all catch and effort statistics are shown below. For April which had only overflight data, the interview data from preceding and following months were combined to estimate the mean daily fishing activity pattern and catch per unit effort. The catch and effort estimates for April are referred to as indirect estimates.

Weighting factors used to estimate the daily fishing activity pattern and mean catch per unit effort were calculated using the equations derived from DPA Consulting Ltd. (1982).

The data obtained from each shift were multiplied by the following weighting factor (W1) to expand for all possible stints at each site. The formula reads:

$$W1_{dij} = \frac{N_d}{n_{dij}} \qquad (1)$$

where N_d is the total number of days of type d in that month and n_{dij} is the number of times the jth work block at the ith site was sampled on type d days.

The interviews aggregrated by work block were multiplied by the weighting factor W2 to expand for all boats that landed in each work block. The formula reads:

$$W2_{dijk} = \frac{L_{dijk}}{I_{dijk}} \qquad (2)$$

where L_{dijk} is the number of boats landed and I_{dijk} is the number of boats interviewed on the kth stint in the jth work block at the ith site on a day type d.

Therefore, the following equations can be used to calculate an unbiased estimate of the total monthly catch ($\hat{C}_{dgr}$), fishing trips ($\hat{T}_{dg}$) and fishing activity in time block $\hat{A}_{dgt}$ for each day type (d) where g is a set of landing sites (i). These formulas read:

Table A-1. Description of terms, variables and subscripts used in this report.

DESCRIPTION OF TERMS

Shift/Stint - Represents a combination of a day type and landing site which was sampled on a single day. i.e. one sampling stint performed by an interviewer.

Work block - Represents one of four possible periods at a particular site of a given day type.

Work Block 1 is before 11 AM
Work Block 2 is 11 AM - 3 PM
Work Block 3 is 3 PM - 7 PM
Work Block 4 is after 7 PM

Day type - There are two possible day types: weekdays and weekends; holidays are considered to be weekend days.

Time block - Each day is divided into 16 time blocks which are:
1) before 7 AM
2) 7:00 - 7:59 AM
3) 8:00 - 8:59 AM
.
.
.
15) 8:00 - 8:59 PM
16) after 9 PM

DESCRIPTION OF VARIABLES

A	-	Number of boats actively fishing
B	-	Number of boats observed on a flight
C	-	Catch
C'	-	Catch of marked salmon
CPE	-	Catch per boat trip
E	-	Effort (estimated total number of boat trips)
I	-	Number of boats interviewed and found to have been fishing
L	-	Number of boats landing
n	-	Number sampled
N	-	Population size from which n samples were observed
P	-	Proportion
T	-	Number of boat trips
V	-	Number found to be marked
W1	-	Weighting factor to expand for all possible stints at each site
W2	-	Weighting factor to expand for all boats that landed in each work block

DESCRIPTION OF SUBSCRIPTS

a	-	age
g	-	a set of landing sites
d	-	day type
i	-	site
j	-	work block
k	-	stint
l	-	landing time block
m	-	month
q	-	the next boat landing at site i and upon interviewing, found to have been fishing(q ranges from 1 to n)
r	-	species
s	-	sub-Statistical Area
t	-	time block
u	-	flight
x	-	region
y	-	annual

$$\hat{C}_{dgr} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} C_{dijkqr} \right) \right] \qquad (3)$$

$$\hat{T}_{dg} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} \right) \right] \qquad (4)$$

$$\hat{A}_{dgt} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} A_{dijkqt} \right) \right] \qquad (5)$$

where C_{dijkqr} is the catch of species r by the qth fishing party, and A_{dijkqt} can equal 0 or 1, thereby indicating whether the qth fishing party was actively fishing in time block t. Thus, the mean monthly catch per unit effort (CPE_{dgr}) measured in terms of numbers of fish kept per completed boat trip, and proportion of daily fishing effort active during the hour of the aerial survey (P_{dgt}) can be calculated with the following equations:

$$CPE_{dgr} = \frac{\hat{C}_{dgr}}{\hat{T}_{dg}} \qquad (6)$$

$$P_{dgt} = \frac{\hat{A}_{dgt}}{\hat{T}_{dg}} \qquad (7)$$

where CPE_{dgr} and P_{dgt} are calculated for each day type (d) and group of landing sites (g). The groups of landing sites reflect geographic areas with similar catch rates and/or activity patterns.

The estimated mean number of boats fishing during the hour of the sport boat count by overflight was calculated for each sub-Statistical Area using the following equation:

$$\bar{B}_{dst} = \frac{\sum_u B_{dstu}}{n_{ds}} \qquad (8)$$

where B_{dstu} is the number of boats observed fishing on flight u at time t, in sub-Statistical Area s for day type d.

The mean sport boat count at the time of the overflight ($\bar{B}_{dst}$) and proportion of daily fishing effort active during the hour of the overflight (P_{dgt}) were used in the following equation to calculate the total fishing effort for sub-Statistical Area s on day type d:

$$E_{ds} = \bar{B}_{dst} \frac{1}{P_{dgt}} N_d \qquad (9)$$

where N_d is the number of type d days in the month. Interview data for the sub-Statistical Areas fished (s) by anglers landing at each of the sites (i) within a landing group (g) were used to select the proportions (P_{dgt}) that are appropriate for each mean boat count ($\bar{B}_{dst}$).

The estimate for total effort by sub-Statistical Area and day type (E_{ds}) and the weighted catch per boat trip for a group of landing sites by day type, area and species (CPE_{dgr}) were used to calculate total catch for each species (r) and each sub-Statistical Area (s).

$$C_{sr} = \sum_{d} (E_{ds} \, CPE_{dgr}) \qquad (10)$$

The interview data were also used to select the catch per effort estimates (CPE_{dgr}) that should be applied to the effort estimate (E_{ds}) for a specific sub-Statistical Area (s).

Variance of Total Fishing Effort

The variance for estimates of total fishing effort has two components:

(1) the variance in aerial sport boat counts:

$$S^2_{B_{dst}} = \frac{\sum_u B^2_{dstu} - \frac{\left(\sum_u B_{dstu}\right)^2}{n_{ds}}}{n_{ds}(n_{ds}-1)} \left[\frac{N_d - n_{ds}}{N_d - 1}\right] \qquad (11)$$

where B_{dstu} is the aerial sport boat count at time t during an aerial survey u on a type d day in sub-area s; n_{ds} is the number of aerial surveys in which boats were counted on type d days, in sub-Statistical Area s; and N_d is the total number of type d days in the month.

(2) the variance in the proportion of boats fishing during the hours of the aerial boat counts:

$$S^2_{P_{dgt}} = \frac{P_{dgt}(1-P_{dgt})}{I_{dg}} \qquad (12)$$

where P_{dgt} is the mean proportion of boats fishing for a group of landing sites g during the hour of the aerial boat count t on type d days, and I_{dg} is the total number of sport fishing boats interviewed. The above formula assumes P_{dgt} is unbiased and normally distributed where the number of interviews is large.

The variances for boat counts ($S^2_{B_{dst}}$) and proportion of boats fishing ($S^2_{P_{dgt}}$) were combined in the following equation to calculate variance for effort:

$$S^2_{E_{ds}} = N^2_d \left(\frac{B^2_{dst}}{P^2_{dgt}}\right)\left(\frac{S^2_{B_{dst}}}{B^2_{dst}} + \frac{S^2_{P_{dgt}}}{P^2_{dgt}}\right) \qquad (13)$$

where $S^2_{E_{ds}}$ is the variance for total effort on type d days in sub-area s, and the formula is the standard formula for the variance of a ratio of two independent random variables.

Variance of Total Catch

The variance for estimates of total catch had two components: (1) the variance for total effort (presented above), and (2) the variance for catch per boat trip.

The variance for catch per boat trip($S^2_{CPE_{dgr}}$) was calculated using the following equation:

$$S^2_{CPE_{dgr}} = \frac{SS_{CPE_{dgr}} - \frac{\left(S_{CPE_{dgr}}\right)^2}{I_{dg}}}{I_{dg}\left(I_{dg}-1\right)} \qquad (14)$$

where $SS_{CPE_{dgr}}$ is the weighted sum of squares for CPE_{dgr}, and $S_{CPE_{dgr}}$ is the weighted sum for CPE_{dgr}, such that the sum of the weighting factors used to estimate CPE_{dgr} was equal to the number of interviewed boat trips (I_{dg}).

The variance for total effort and the variance in the catch per boat trip for the appropriately grouped landing sites were combined in the following equation to calculate variance for total catch:

$$S^2_{C_{sr}} = \sum_d \left(E^2_{ds} S^2_{CPE_{dgr}} + CPE^2_{dgr} S^2_{E_{ds}} + S^2_{CPE_{dgr}} S^2_{E_{ds}} \right) \qquad (15)$$

which is the standard formula for the variance of the product of two independent random variables, and where S^2C_{sr} is the variance for total number of species r in sub-Statistical Area s.

Estimation of Marked Chinook and Coho Salmon

Incidence of marked (adipose-clipped) chinook and coho was recorded in each interview. The proportion of marks observed for each region, month and species (P_{xmr}) was calculated as:

$$P_{xmr} = \frac{V_{xmr}}{n_{xmr}} \qquad (16)$$

where V is the number of marked fish observed and n is the number of fish inspected by region(x), month(m) and species (r).

The variance of each proportion was calculated as:

$$S^2_{P_{xmr}} = \frac{P_{xmr}(1 - P_{xmr})}{n_{xmr}} \qquad (17)$$

Monthly catch estimates of marked salmon were calculated as:

$$C'_{xmr} = P_{xmr} C_{xmr} \qquad (18)$$

where C_{xmr} is the estimated catch of species r in region x and month m.

The variance of the marked catch estimates was calculated as:

$$S^2_{C'_{xmr}} = P^2_{xmr} S^2_{C_{xmr}} + C^2_{xmr} S^2_{P_{xmr}} + S^2_{C_{xmr}} S^2_{P_{xmr}} \qquad (19)$$

where S^2C_{xmr} is the variance of the catch estimate of species r in region x and month m.

The estimated annual proportions of marked salmon caught in each region (weighted by the corresponding regional annual catch estimates) were calculated as:

$$P_{xry} = \frac{C'_{xry}}{C_{xry}} \qquad (20)$$

where

$$C'_{xry} = \sum_m C'_{xmr} \quad \text{and} \quad C_{xry} = \sum_m C_{xmr} \qquad (21)$$

The variance of the annual proportions was calculated as:

$$S^2_{P_{xry}} = \left(\frac{C'_{xry}}{C_{xry}}\right)^2 \left[\frac{S^2_{C'_{xry}}}{(C'_{xry})^2} + \frac{S^2_{C_{xry}}}{(C_{xry})^2}\right] \qquad (22)$$

where $S^2_{C_{xry}}$ is the variance of the annual estimated catch of species r in region x.

Estimation of Age Composition of Chinook Catch

Scale samples and length measurements were taken in a subsampling program during the interview process. Ages used in this report represent total age of the fish (including both freshwater and oceanic life) according to the Gilbert-Rich (1927) recording convention.

The proportion of chinook at each age and month (P_{am}) was calculated as:

$$P_{am} = \frac{a_m}{n_m} \qquad (23)$$

where a_m represents the number of fish observed at age a during month m, and n_m is the total number of fish biosampled in that month.

The variance of each proportion was calculated as:

$$S^2_{am} = \frac{P_{am}(1 - P_{am})}{n_m} \qquad (24)$$

The catch at age of chinook in each month was calculated as:

$$C_{am} = P_{am} C_m \qquad (25)$$

where C_m is the estimated catch of chinook salmon in a given month m.

The variance of the catch at age estimate was calculated as:

$$S^2_{C_{am}} = P^2_{am} S^2_{C_m} + C^2_m S^2_{P_{am}} + S^2_{C_m} S^2_{P_{am}} \qquad (26)$$

where $S^2_{C_m}$ is the variance of the monthly catch estimate C_m.

The annual catch at age was calculated as:

$$C_{ay} = \sum_m C_{am} \qquad (27)$$

with a variance

$$S^2_{C_{ay}} = \sum_m S^2_{C_{am}} \qquad (28)$$

The annual proportion at age (weighted by monthly catch) was calculated as:

$$P_{ay} = \frac{C_{ay}}{C_y} \qquad (29)$$

with a variance

$$S^2_{P_{ay}} = \left(\frac{C_{ay}}{C_y}\right)^2 \left[\frac{S^2_{C_{ay}}}{(C_{ay})^2} + \frac{S^2_{C_y}}{(C_y)^2}\right] \qquad (30)$$

APPENDIX B

CATCH AND EFFORT STATISTICS BY MONTH AND STATISTICAL AREA FOR STRAIT OF GEORGIA, 1985.

APPENDIX B-1. STRAIT OF GEORGIA FISHING EFFORT (NO. BOAT TRIPS), 1985.

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Estimate	805	446	168	772	917	716	303	2,509	1,213	932	8,781
	S.E.	175	144	55	139	250	185	66	245	153	338	610
March	Estimate	855	645	355	1,053	1,814	1,063	593	2,643	1,676	369	11,066
	S.E.	95	113	124	229	351	187	125	436	460	96	821
April	Estimate	1,471	2,767	412	6,456	7,331	1,564	1,401	2,437	1,864	1,156	26,859
	S.E.	350	275	83	1,089	714	275	280	677	578	206	1,700
May	Estimate	15,043	13,860	520	11,485	10,897	3,047	4,504	4,303	3,959	4,199	71,817
	S.E.	3,791	1,948	97	1,284	1,151	424	800	802	742	1,027	4,921
June	Estimate	22,524	21,750	2,641	13,562	14,249	5,145	6,121	8,412	3,933	2,330	100,667
	S.E.	2,243	1,713	355	1,119	1,048	990	1,088	1,232	444	376	3,803
July	Estimate	33,189	25,327	3,098	16,176	9,453	5,299	6,290	11,927	5,545	5,079	121,383
	S.E.	1,945	1,601	326	845	998	390	510	609	448	644	3,092
August	Estimate	37,313	28,736	2,468	18,844	10,396	8,128	7,778	23,875	9,198	5,818	152,554
	S.E.	2,220	2,280	440	1,176	1,122	644	982	2,953	659	656	4,891
September	Estimate	18,018	21,965	1,968	12,155	11,596	5,448	4,687	18,860	4,469	4,439	103,605
	S.E.	1,949	1,975	356	1,233	1,283	552	539	2,728	740	521	4,455
October	Estimate	2,199	2,265	432	2,455	1,647	1,443	1,421	2,400	1,168	1,006	16,436
	S.E.	469	471	210	380	349	322	323	371	268	193	1,099
Nov+Dec	Estimate	1,517	463	33	4,334	1,568	595	146	4,458	1,389	842	15,345
	S.E.	274	180	33	977	587	165	96	2,022	256	190	2,374
Total	Estimate	132,934	118,224	12,095	87,292	69,868	32,448	33,244	81,824	34,414	26,170	628,513
	S.E.	5,689	4,331	795	2,979	2,736	1,519	1,884	4,861	1,624	1,597	10,139

APPENDIX B-2. STRAIT OF GEORGIA COHO CATCH SUMMARY, 1985.

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	394	4	0	3	0	30	531	32	78	1,072
	S.E.	0	255	4	1	3	0	23	102	20	44	280
March	Catch	89	1,607	3	1	589	23	23	3,854	9	4	6,202
	S.E.	61	539	2	2	186	19	22	904	10	3	1,071
April	Catch	315	16,325	41	150	24,487	146	124	1,102	233	1,349	44,272
	S.E.	201	1,753	16	43	2,634	110	72	423	240	1,087	3,390
May	Catch	23,706	31,039	722	12,670	26,963	561	37	206	272	613	96,789
	S.E.	6,710	4,129	144	1,700	3,631	191	22	105	62	163	8,846
June	Catch	72,332	60,348	5,523	14,901	17,753	194	380	1,333	273	598	173,635
	S.E.	8,160	4,918	776	1,360	1,934	89	147	338	66	134	9,855
July	Catch	82,585	49,734	5,941	26,152	10,591	3,030	892	5,483	3,283	4,829	192,520
	S.E.	5,272	3,154	700	1,585	1,202	370	165	538	338	542	6,561
August	Catch	56,356	33,191	2,175	19,473	8,301	3,196	702	4,731	7,417	5,933	141,475
	S.E.	3,638	2,736	425	1,562	1,099	390	183	791	782	674	5,141
September	Catch	21,771	20,845	1,722	5,287	6,368	655	405	7,403	895	1,019	66,370
	S.E.	2,526	2,236	337	748	922	168	112	1,520	184	179	3,914
October	Catch	1,473	1,589	198	913	239	266	159	415	138	70	5,460
	S.E.	403	408	108	173	61	115	57	107	56	30	637
Nov+Dec	Catch	0	44	0	103	0	0	0	246	8	1	402
	S.E.	0	40	0	74	0	0	0	143	8	3	166
Total	Catch	258,627	215,116	16,329	79,650	95,294	8,071	2,752	25,304	12,560	14,494	728,197
	S.E.	12,618	8,202	1,191	3,208	5,235	622	324	2,095	911	1,417	16,532

APPENDIX B-3. STRAIT OF GEORGIA CHINOOK CATCH SUMMARY, 1985.

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	80	0	135	188	209	418	213	2,252	1,064	1,277	5,836
	S.E.	76	0	49	65	65	184	74	436	156	373	640
March	Catch	134	82	198	67	1,253	193	148	505	1,072	249	3,901
	S.E.	92	40	60	59	353	71	59	120	375	76	558
April	Catch	159	525	385	1,139	3,526	84	343	727	944	353	8,185
	S.E.	85	122	81	447	445	52	112	322	384	131	843
May	Catch	6,212	8,459	529	5,237	8,338	2,861	4,084	1,110	3,676	4,303	44,809
	S.E.	1,865	1,140	99	776	1,435	493	822	288	719	1,262	3,250
June	Catch	13,394	15,523	1,810	5,094	8,724	3,187	4,417	2,658	1,084	601	56,492
	S.E.	1,417	1,418	283	506	808	785	900	420	160	112	2,578
July	Catch	13,913	7,575	741	2,946	1,963	1,269	2,435	4,435	440	491	36,208
	S.E.	980	657	112	241	270	190	328	334	71	76	1,342
August	Catch	13,687	6,887	514	2,853	2,641	2,594	3,623	4,561	308	476	38,144
	S.E.	1,335	679	134	325	365	421	688	696	75	77	1,910
September	Catch	3,897	4,678	796	2,039	4,050	1,210	1,898	2,355	157	195	21,275
	S.E.	487	583	168	297	577	225	288	474	46	51	1,179
October	Catch	137	392	278	1,076	405	124	461	481	99	100	3,553
	S.E.	54	113	131	237	134	58	134	140	40	33	388
Nov+Dec	Catch	49	124	50	5,824	371	52	9	8,759	669	528	16,435
	S.E.	47	82	49	1,428	209	33	11	4,369	181	120	4,608
Total	Catch	51,662	44,245	5,436	26,463	31,480	11,992	17,631	27,843	9,513	8,573	234,838
	S.E.	2,914	2,140	425	1,847	1,908	1,081	1,480	4,527	950	1,341	6,845

APPENDIX B-4. STRAIT OF GEORGIA PINK CATCH SUMMARY, 1985.

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
March	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
April	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
May	Catch	0	104	0	0	0	0	0	0	0	0	104
	S.E.	0	43	0	0	0	0	0	0	0	0	43
June	Catch	206	302	0	0	52	0	55	85	0	0	700
	S.E.	81	57	0	0	21	0	63	37	0	0	125
July	Catch	167	244	7	57	85	0	0	915	0	8	1,483
	S.E.	43	41	4	20	20	0	0	99	0	5	119
August	Catch	2,078	546	41	273	318	141	22	47,913	348	153	51,833
	S.E.	447	75	19	55	76	26	21	6,778	65	33	6,794
September	Catch	5,370	1,933	22	522	241	109	24	27,410	336	411	36,378
	S.E.	999	332	11	166	69	36	17	4,577	87	111	4,702
October	Catch	687	37	0	0	0	0	0	24	0	0	748
	S.E.	214	24	0	0	0	0	0	12	0	0	216
Nov+Dec	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
Total	Catch	8,508	3,166	70	852	696	250	101	76,347	684	572	91,246
	S.E.	1,119	351	22	176	107	44	69	8,179	109	116	8,267

APPENDIX B-5. STRAIT OF GEORGIA CATCH SUMMARY FOR OTHER SALMON, 1985. *

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	0	0	16	0	0	0	0	0	16
	S.E.	0	0	0	0	17	0	0	0	0	0	17
March	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
April	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
May	Catch	0	8	0	0	12	5	0	0	5	6	36
	S.E.	0	7	0	0	9	4	0	0	3	5	13
June	Catch	19	25	0	0	33	0	0	23	0	0	100
	S.E.	15	13	0	0	32	0	0	19	0	0	42
July	Catch	121	52	0	30	50	28	28	220	10	13	552
	S.E.	64	25	0	17	24	10	26	76	6	6	110
August	Catch	487	116	8	68	0	29	0	1,078	113	41	1,940
	S.E.	136	53	10	28	0	10	0	231	46	16	279
September	Catch	1,029	300	0	0	124	0	16	394	16	4	1,883
	S.E.	196	116	0	0	37	0	14	128	19	5	265
October	Catch	786	135	2	183	93	0	35	36	190	98	1,558
	S.E.	218	47	3	53	36	0	18	16	77	41	249
Nov+Dec	Catch	0	821	0	17	0	1,357	18	8	8	5	2,234
	S.E.	0	551	0	18	0	850	32	11	8	5	1,014
Total	Catch	2,442	1,457	10	298	328	1,419	97	1,759	342	167	8,319
	S.E.	330	568	10	65	68	850	47	276	92	45	1,119

* Includes chum and sockeye.

APPENDIX B-6. STRAIT OF GEORGIA CATCH SUMMARY FOR TOTAL SALMONIDS, 1985. *

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	80	394	139	189	233	418	244	2,784	1,097	1,357	6,935
	S.E.	76	255	52	65	74	184	82	485	161	397	737
March	Catch	225	1,690	201	68	1,844	217	171	4,360	1,081	257	10,114
	S.E.	154	562	61	60	495	75	64	966	380	78	1,298
April	Catch	477	16,852	426	1,290	28,017	232	468	1,832	1,177	1,705	52,476
	S.E.	212	1,815	92	467	2,987	138	139	614	489	1,078	3,782
May	Catch	29,922	39,617	1,252	17,914	35,319	3,430	4,122	1,318	3,957	4,924	141,775
	S.E.	8,212	4,955	237	2,204	4,540	588	824	334	757	1,306	10,997
June	Catch	85,960	76,210	7,333	19,998	26,569	3,384	4,853	4,103	1,357	1,201	230,968
	S.E.	9,343	6,112	1,002	1,739	2,554	810	1,002	729	192	210	11,725
July	Catch	96,794	57,616	6,693	29,192	12,694	4,331	3,355	11,058	3,734	5,344	230,811
	S.E.	5,996	3,694	786	1,727	1,407	461	420	822	376	596	7,533
August	Catch	72,621	40,752	2,741	22,675	11,266	5,963	4,348	58,291	8,188	6,607	233,452
	S.E.	4,618	3,352	542	1,759	1,408	599	784	7,983	830	737	10,191
September	Catch	32,076	27,767	2,543	7,857	10,793	1,976	2,344	37,567	1,408	1,632	125,963
	S.E.	3,630	2,767	483	971	1,451	331	346	6,324	272	255	8,030
October	Catch	3,089	2,159	479	2,178	741	392	656	962	431	270	11,357
	S.E.	750	522	234	396	194	139	178	238	124	76	1,101
Nov+Dec	Catch	49	993	50	5,944	371	1,411	28	9,016	687	539	19,088
	S.E.	47	571	49	1,435	209	851	35	4,482	182	122	4,827
Total	Catch	321,293	264,050	21,857	107,305	127,847	21,754	20,589	131,291	23,117	23,836	1,062,939
	S.E.	15,027	9,936	1,509	4,165	6,516	1,576	1,630	11,257	1,404	2,015	22,902

* Includes coho, chinook, pink, chum, sockeye, steelhead and cutthroat trout.

APPENDIX B-7. STRAIT OF GEORGIA CATCH SUMMARY FOR RELEASED SALMON, 1985.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	67	39	20	91	87	64	2,786	269	493	3,916
	S.E.	0	62	18	16	28	41	21	272	57	174	339
March	Catch	678	201	25	12	198	63	67	3,693	281	145	5,363
	S.E.	292	72	12	14	66	27	27	1,083	148	45	1,137
April	Catch	0	3,197	40	121	4,000	122	261	1,027	97	302	9,167
	S.E.	0	471	15	69	555	80	98	480	71	226	915
May	Catch	7,964	4,593	115	1,745	4,114	548	1,291	303	390	524	21,587
	S.E.	2,720	755	24	442	632	149	318	92	110	148	2,955
June	Catch	11,601	6,736	324	997	3,120	280	1,893	349	208	163	25,671
	S.E.	1,424	622	78	159	388	119	537	128	72	64	1,710
July	Catch	12,168	17,721	956	6,908	5,729	2,226	1,324	3,301	2,947	2,796	56,076
	S.E.	1,093	1,337	138	738	750	382	280	414	414	449	2,208
August	Catch	43,580	56,818	6,642	25,958	23,142	3,791	6,124	52,681	7,385	6,029	232,150
	S.E.	3,254	4,862	1,335	2,499	2,946	497	966	8,020	797	809	10,850
September	Catch	66,002	82,882	6,904	28,351	43,824	7,298	5,921	44,194	4,820	4,555	294,751
	S.E.	8,459	9,028	1,361	3,729	5,983	1,349	926	8,398	1,040	975	16,729
October	Catch	5,939	5,464	1,248	7,239	3,474	2,647	3,351	3,033	3,397	2,597	38,389
	S.E.	1,637	1,271	653	1,352	775	759	669	682	1,153	693	3,232
Nov+Dec	Catch	99	520	35	3,706	1,340	163	164	8,252	1,064	851	16,194
	S.E.	122	322	35	1,085	675	76	146	4,045	321	262	4,279
Total	Catch	148,031	178,199	16,328	75,057	89,032	17,225	20,460	119,619	20,858	18,455	703,264
	S.E.	9,775	10,480	2,022	4,891	6,853	1,685	1,655	12,383	1,835	1,570	21,098

APPENDIX B-8. STRAIT OF GEORGIA ROCKFISH CATCH SUMMARY, 1985.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	422	40	35	119	615	654	47	226	88	91	2,337
	S.E.	294	40	17	81	273	339	23	54	35	41	539
March	Catch	120	0	40	6	1,257	1,115	74	286	35	23	2,956
	S.E.	68	0	28	6	569	626	37	136	26	8	861
April	Catch	477	20	92	320	1,391	904	481	1,038	254	468	5,445
	S.E.	212	15	41	126	335	486	393	464	155	258	934
May	Catch	3,054	495	46	5,014	2,316	1,640	810	2,363	299	434	16,471
	S.E.	1,234	311	12	899	681	373	327	496	59	130	1,845
June	Catch	1,307	1,626	213	7,650	4,452	2,971	1,359	2,592	1,008	644	23,822
	S.E.	243	222	54	1,075	768	1,090	465	480	198	138	1,884
July	Catch	3,313	3,486	419	7,751	3,396	1,500	853	2,677	1,397	1,304	26,096
	S.E.	481	705	99	793	592	256	295	341	261	249	1,455
August	Catch	2,852	2,677	533	9,800	3,691	1,764	1,396	2,616	1,940	1,667	28,936
	S.E.	393	330	157	1,148	623	359	524	649	423	288	1,755
September	Catch	2,131	3,590	202	6,599	3,012	783	352	1,542	1,294	1,406	20,911
	S.E.	399	605	56	1,742	494	184	140	426	332	376	2,072
October	Catch	666	433	129	944	276	222	211	1,064	793	483	5,221
	S.E.	214	194	102	276	79	105	109	225	315	187	620
Nov+Dec	Catch	74	30	3	341	451	570	36	279	93	40	1,917
	S.E.	92	25	3	132	216	286	30	157	40	23	427
Total	Catch	14,416	12,397	1,712	38,544	20,857	12,123	5,619	14,683	7,201	6,560	134,112
	S.E.	1,522	1,076	232	2,657	1,612	1,546	935	1,228	726	653	4,349

APPENDIX B–9. STRAIT OF GEORGIA LINGCOD CATCH SUMMARY, 1985.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	4	1	0	0	0	2	3	5	15 *
	S.E.	0	0	3	1	0	0	0	3	1	3	5
March	Catch	0	0	10	1	0	0	0	73	14	8	106 *
	S.E.	0	0	10	1	0	0	0	44	15	5	48
April	Catch	786	40	7	31	585	540	340	447	157	114	3,047
	S.E.	512	27	4	11	265	232	169	202	110	201	713
May	Catch	6,123	268	44	2,855	2,728	1,403	413	2,056	536	566	16,992
	S.E.	1,827	123	10	493	810	302	110	394	121	195	2,136
June	Catch	4,254	1,344	245	3,587	2,009	1,330	306	1,275	585	341	15,276
	S.E.	629	211	62	487	300	452	92	210	109	81	1,023
July	Catch	4,100	2,297	176	2,664	1,095	938	408	1,625	679	614	14,596
	S.E.	417	272	36	296	194	156	110	194	115	119	690
August	Catch	3,600	1,372	227	3,848	980	453	358	1,549	661	781	13,829
	S.E.	374	168	86	598	170	126	146	333	141	160	869
September	Catch	3,641	731	131	694	1,125	452	490	2,559	256	138	10,217
	S.E.	556	164	39	179	194	125	230	865	73	42	1,110
October	Catch	599	129	14	229	210	113	46	985	163	95	2,583
	S.E.	177	74	10	71	66	49	32	213	67	41	318
Nov+Dec	Catch	74	13	0	74	131	54	0	78	14	4	442 *
	S.E.	92	11	0	40	82	40	0	52	11	4	146
Total	Catch	23,177	6,194	858	13,984	8,863	5,283	2,361	10,649	3,068	2,666	77,103
	S.E.	2,158	442	120	982	965	640	369	1,089	286	358	2,951

* A total closure for lingcod was in effect from January 1 to April 15, and November 15 to December 31, 1985; see Table 3 footnote.

APPENDIX B-10. STRAIT OF GEORGIA DOGFISH CATCH SUMMARY, 1985.

Month		Statistical Area										
		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	2	0	0	0	0	0	15	2	19
	S.E.	0	0	1	0	0	0	0	0	7	1	7
March	Catch	0	0	0	0	0	0	0	2	105	1	108
	S.E.	0	0	0	0	0	0	0	3	43	2	43
April	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
May	Catch	0	69	0	222	160	0	36	0	11	15	513
	S.E.	0	50	0	122	109	0	27	0	5	9	173
June	Catch	11	124	0	218	139	14	8	47	70	57	688
	S.E.	13	31	0	140	61	14	9	29	25	27	164
July	Catch	43	179	0	77	86	94	18	187	222	166	1,072
	S.E.	21	46	0	80	32	58	21	76	63	57	164
August	Catch	0	78	3	22	49	181	0	0	168	47	548
	S.E.	0	28	3	16	19	78	0	0	85	27	124
September	Catch	30	603	0	557	44	16	0	150	23	92	1,515
	S.E.	26	412	0	247	23	9	0	148	20	45	506
October	Catch	24	1	0	45	14	13	23	4	56	27	207
	S.E.	20	1	0	25	10	16	23	0	37	17	60
Nov+Dec	Catch	0	0	0	0	0	7	3	0	0	0	10
	S.E.	0	0	0	0	0	7	3	0	0	0	8
Total	Catch	108	1,054	5	1,141	492	325	88	390	670	407	4,680
	S.E.	41	420	3	321	133	100	42	169	125	84	601

APPENDIX B-11. STRAIT OF GEORGIA CATCH SUMMARY FOR OTHER FINFISH, 1985.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	2	58	118	154	28	213	45	36	654
	S.E.	0	0	1	27	44	64	18	98	16	23	132
March	Catch	0	0	0	0	68	1,876	1,608	2,204	332	0	6,088
	S.E.	0	0	0	0	31	958	1,015	1,370	172	0	1,964
April	Catch	0	88	1	6	506	302	8	194	201	215	1,521
	S.E.	0	49	1	4	279	259	11	144	140	231	491
May	Catch	0	392	0	270	216	546	37	237	158	173	2,029
	S.E.	0	210	0	104	118	254	22	63	59	88	386
June	Catch	777	309	2	1,023	7,121	9,174	356	294	308	183	19,547
	S.E.	271	54	1	214	2,201	3,617	192	85	81	51	4,255
July	Catch	575	676	0	336	481	521	229	1,018	366	261	4,463
	S.E.	106	102	0	72	160	205	175	194	70	60	414
August	Catch	1,055	1,786	0	735	768	1,962	812	1,981	749	334	10,182
	S.E.	286	261	0	168	179	688	518	530	141	76	1,122
September	Catch	461	2,802	76	1,164	655	751	222	1,161	669	689	8,650
	S.E.	146	537	38	628	176	256	126	381	380	349	1,109
October	Catch	63	652	31	494	118	575	10	760	267	210	3,180
	S.E.	56	251	19	149	90	313	9	444	97	70	637
Nov+Dec	Catch	0	129	0	279	335	929	0	512	26	7	2,217
	S.E.	0	130	0	281	180	570	0	593	18	8	897
Total	Catch	2,931	6,834	112	4,365	10,386	16,790	3,310	8,574	3,121	2,108	58,531
	S.E.	437	704	43	766	2,251	3,891	1,176	1,712	488	448	5,122

APPENDIX C. STRAIT OF GEORGIA CREEL SURVEY STUDY AREA.

The Strait of Georgia Creel Survey study area includes those waters of Juan de Fuca Strait and the Strait of Georgia bounded in the south by a line from Sheringham Pt. on Vancouver Island due south to an intersection with the International Boundary and along the International Boundary to the B.C. Mainland coast at Blaine (Boundary Bay) and in the north by the following 3 boundary lines:

1) in discovery passage from Granite Pt. on Quadra Island to the stream mouth west of Moriarity Pt. on Vancouver Island.

2) in Okisollo Channel from Granite Pt. on Quadra Island due north to Sonora Island.

3) in Cordero Channel from Burnt Bluff on the mainland 214° passing west of Dent Island to Sonora Island.

The area for which the Strait of Georgia Creel Survey statistics apply includes the above listed administrative area with the exception of the following areas:

1) Bute Inlet above a line from Lawrence Pt. running across the inlet. This area coincides with management units 13-21 and 13-22.

2) Waters of Pryce Channel, Waddington Channel, Pendrell Sound, Homfray Channel and Toba Inlet bounded by a line drawn from Horace Head on East Redonda Island at the south end of Waddington Channel to the northern point of Roscoe Bay on West Redonda Island and a line drawn within Homfray Channel from Price Pt. on the eastern shore of the channel by a line drawn from George Head at the easterly entrance of Ramsay Arm to Sutil Pt. on Cortes Island.

3) Hotham Sound above a line drawn from Elephant Point on the western shore of the Sound to the southern point of Granville Bay on the eastern shore of the Sound.

4) Jervis Inlet above a line drawn within Prince of Whales Reach from the mouth of Treat Creek on the east shore across the Reach to the summit (1625') at the head of Goliath Bay.

5) Sechelt Inlet including Narrows Inlet and Salmon Inlet above a line drawn within Skookumchuck Narrows from the "dog-leg" point southeast of the Egmont Pt. 224° across the Narrows to Sechelt Peninsula.

APPENDIX D. SPECIES COMMONLY INCLUDED WITH OTHER FINFISH.

Pacific Herring
Pacific Cod
Pacific Tomcod
Walleye Pollock
Pacific Hake
Perches - any perch, seaperch or surfperch
Greenlings
Flounders - Pacific Halibut, any flounder or sole